D. H. Lawrence and Pre-Einsteinian Modernist Relativity

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To Akiko and Sachiko

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INTRODUCTION

> *Encounter, whether between peoples, between disciplines, or answering a ring at the bell, braces attention. It does not guarantee understanding; it may emphasize first (or only) what's incommensurate. But it brings into active play unexamined assumptions and so may allow interpreters … to tap into unexpressed incentives.* (Gillian Beer, *Open Fields* 1996, 2)

Lawrence's Encounter with Albert Einstein

In a letter dated June 16, 1921, British novelist D. H. Lawrence (1885–1930) sent his Russian friend S. S. Koteliansky a brief but favourable comment on the German physicist Albert Einstein's *Relativity: The Special and General Theory*, an English translation published in the previous year:

> Einstein isn't so metaphysically marvellous, but I like him for taking out the pin which fixed down our fluttering little physical universe. (1987a, 37)

On June 4, Lawrence asked Koteliansky to send "a simple book on Einstein's Relativity" (23). Five days later, on June 9, he sent another letter to remind Koteliansky of the book: "As soon as Einstein comes I will send you a cheque for it" (30). When he finally received the book on June 15, he wrote a letter of "very many thanks" (36). Having taken only a day to read the book, Lawrence made an amazingly quick response to Einstein's theory of relativity. In *Einstein's Wake*, Michael Whitworth notes Lawrence's "*enthusiastic* response to Einstein" (2001, 132; emphasis added). Yet, when Lawrence said, "Einstein isn't so metaphysically marvellous," he also implied that even before he read Einstein's work he had been aware of the idea of relativity at least on the "metaphysical" level. As Bruce Clarke says in *Energy Forms*, Lawrence was "a somewhat *detached* witness to the early ascent of Einstein to cultural stardom" (2001, 208; emphasis added). No doubt Lawrence was keenly interested in Einstein's theory of relativity at the time, but his attitude towards it was quite ambivalent.

In *Fantasia of the Unconscious* (1922), which was written at the time of reading Einstein's theory of relativity, Lawrence demonstrates an

ambivalent attitude. His "enthusiastic response" to Einstein's vision of the universe is found in the following passage:

> We are all very pleased with Mr Einstein for knocking that external axis out of the universe. The universe isn't a spinning wheel. It is a cloud of bees flying and veering round. Thank goodness for that, for we were getting drunk on the spinning wheel. So that now the universe has escaped from the pin which was pushed through it, like an impaled fly vainly buzzing: now that the multiple universe flies its own complicated course quite free, and hasn't got any hub, we can hope also to escape. (2004, 72)

It is Lawrence who was "very pleased" with Einstein's new, relative vision of the universe, which took the place of Isaac Newton's vision of absolute space and time. In the passage above, Lawrence uses the image of "a spinning wheel," which was (and still is) closely associated with Newton's physics; according to Newton's First Law of Motion, or the law of inertia, an object that is rotating on an axis wants to keep spinning. Lawrence is quite positive about Einstein's removing the "axis" or "pin," which indicates the fixed centre of the universe in the old paradigm. Furthermore, Lawrence describes Einstein's vision as "a cloud of bees flying and veering round," evoking the image of a lively and randomly moving universe.

Later in *Fantasia of the Unconscious*, however, Lawrence's attitude towards Einstein's theory is detached; he considers Einstein's theory in relation to Newton's Law of Inertia:

> Mr Einstein's Theory of Relativity does not supersede the Newtonian Law … of Inertia. It only says "Be aware! The Law of Inertia is not the simple ideal proposition you would like to make of it. It is a vast complexity." (2004, 167)

This statement indicates that Lawrence does not so highly evaluate Einstein's theory of relativity.

In order to understand such varied implications of Einstein's theory for Lawrence, Gillian Beer's definition of the basic characteristic of an "encounter" will be helpful. In *Open Fields*, which centres on the cultural encounter between science and literature, Beer states:

> Encounter, whether between peoples, between disciplines, or answering a ring at the bell, braces attention. It does not guarantee understanding; it may emphasize first (or only) what's incommensurate. But it brings into active play unexamined assumptions and so may allow interpreters … to tap into unexpressed incentives. (1996, 2)

Lawrence's encounter with Einstein's theory of relativity indeed "braces attention." It might well be that this encounter did "not guarantee understanding." Michael Whitworth, for instance, says that Lawrence's "enthusiastic response to Einstein" is based on a "misconception" (2001, 132). This is not surprising because, at the time, Einstein's theory was notorious for being unintelligible; even scientists had tremendous difficulty in mastering his new physics.[1]

Nevertheless, Lawrence's encounter with Einstein's theory allowed Lawrence "to tap into unexpressed incentives." Bruce Clarke remarks that Lawrence's knowledge of Einstein's theory "had a subtle but significant effect on his writings after 1921" (2001, 213). In fact, after Lawrence made his first comment on Einstein's theory, he continued to show his great interest in Einstein's theory in his later works, such as *Kangaroo* (1923) and "Relativity," a poem included in *Pansies* (1929). The exploration of such "unexpressed incentives" that Lawrence gained from his encounter with Einstein's theory is essential in considering the significance of Lawrence's responses to the idea of relativity.

At the same time, it is of equal importance to investigate what "unexamined assumptions" (Beer 1996, 2) Lawrence had before reading Einstein's theory. However, this aspect has not drawn much attention, and only a few critics have offered some suggestions. Nancy Katherine Hayles, for instance, remarks in "The Ambivalent Approach: D. H. Lawrence and the New Physics" that Lawrence "hoped that it [the Einsteinian revolution in science] would lead to a scientific model more compatible with his *beliefs*" (1982, 106; emphasis added). In *D. H. Lawrence: Triumph to Exile*, Mark Kinkead-Weekes also suggests that Lawrence already had an idea of relativity before he read Einstein's theory:

> He [Lawrence] is pleased to find, in Einstein's "popular exposition" of his theory of relativity … that the new theory subverts the idea of a universe governed by a unitary system of scientific laws, and substitutes instead the idea that cosmic forces can only be known in relation to one another. This seemed to reinforce his own denial (since 1914) of any one absolute principle, and hence his belief that life was always a matter of relationships—between opposite impulses within the self, and between selves, none paramount, all "purely relative to one another," in an essentially creative pluralism. (1996, 659; emphasis added)

What both Kinkead-Weekes and Hayles have pointed out is that Lawrence had already had the "belief(s)" in relativity even before he learned Einstein's theory. This is also suggested by Lawrence himself. In the letter quoted at the beginning, he writes: "Einstein isn't so metaphysically

marvellous" (1987a, 37).

The "metaphysic" is very important to Lawrence's creative activities. In *Fantasia of the Unconscious*, an essay in which Lawrence expresses his keen interest in Einstein's theory of relativity, he states:

> [I]t seems to me that even art is utterly dependent on philosophy: or if you prefer it, on a metaphysic. The metaphysic or philosophy may not be anywhere very accurately stated and may be quite unconscious, in the artist, yet it is a metaphysic that governs men at the time, and is by all men more or less comprehended, and lived. Men live and see according to some gradually developing and gradually withering vision. This vision exists also as a dynamic idea or metaphysic—exists first as such. Then it is unfolded into life and art. (2004, 65)

Lawrence thinks it natural that men, in particular artists, should "live and see" according to a "metaphysic," which is "unfolded" into "life and art," although they are "quite unconscious" of this process of their own thinking. It turns out that the "metaphysic" that "governed" Lawrence's thinking just before his encounter with Einstein's theory was the "metaphysic" of relativity. Lawrence was indeed "living and seeing" according to the "vision" of relativity, and trying to represent it in his works.

It is also important to note that Lawrence was not alone in exploring this vision of relativity at the time. In late nineteenth and early twentieth-century Europe before the publication of Einstein's theory, there had been a great enthusiasm for a new vision of the dynamic, relative world, which was very different from the Newtonian vision of the mechanical, absolute world. Such an enthusiasm was shared by a great number of artists and intellectuals of the time and gradually moulded the international, interdisciplinary movement known as modernism. As Gillian Beer states, "The argument concerning the relativity of knowledge is absolutely necessary to the emergence of modernism" (1996, 303).

To define modernism is, as Lyn Pykett says in *Engendering Fictions*, "notoriously difficult" (1995, 9), and numerous, conflicting definitions of modernism have been provided. Modernism has been narrowly interpreted as the Anglo-American new literary movement of the early twentieth century, represented by Ezra Pound, T. S. Eliot, Wyndham Lewis, and James Joyce. Yet, in a broader sense, modernism is taken as a response to the cultural climate of modernity. Pykett regards modernism as "an aesthetic response to a moment of rupture," emphasising the significance of "the *Zeitgeist* or spirit of the age" (7). In *Modernism*, Peter Childs also thinks that modernism is "a response by artists and writers" to modernity, which he specifies as "industrialisation, urban society, war, technological

change and new philosophical ideas" (2000, 20).

Both Lawrence and Einstein lived in this cultural context of modernity that gave birth to modernism. In *The First Moderns*, William R. Everdell includes Einstein in the first modernists who contributed to the development of the modern thought of the twentieth century (1997, 227–40). In *Inside Modernism*, Thomas Vargish and Delo E. Mook argue how Einstein's Relativity Theory, alongside Cubism and modernist narratives, represents modern values, saying that "Einstein is the more representative modernist" (1999, 12). In the Introduction to *Modernism*, Tim Armstrong thinks that Einstein's modernity lies in "his background (*fin de siècle* Vienna)," "his models (trains moving across time zones)," and "the way he was represented (the genius-iconoclast)" (2005, 115).

In Lawrence's case, critics have regarded him as a modernist in considering his responses to modernity, while he has generally been underestimated due to his lack of artistic experimentation. Lawrence has often been compared to Joyce since F. R. Leavis posed the famous question "Lawrence or Joyce?" in *D. H. Lawrence: Novelist*. According to Leavis, Lawrence and Joyce "were preeminently the testing, the crucial authors: if you took Joyce for a major creative writer, then, like Mr Eliot, you had no use for Lawrence, and if you judged Lawrence a great writer, then you could hardly take a sustained interest in Joyce" (1955, 10). Critics have attributed the greatest difference between these two writers to their completely opposing attitudes towards artistic experiments. In *The World We Imagine*, Mark Schorer states that Lawrence's "ideal of subject matter … led him in effect to eschew technique," while Joyce's "practice made claims for the supremacy of technique beyond those made by anyone in the past or by anyone else in this century" (1969, 4). In *Flame into Being*, Anthony Burgess also says that Lawrence, "unlike Joyce, never planned" (1985, 130); and in "Defining Modernism," Lawrence Gamache calls Lawrence "the intuitive man of feeling" while defining Joyce as "the rational technician" (1992, 70).

A focus on the cultural encounter between the two modernists, Lawrence and Einstein, will reveal that Lawrence was truly a modernist in terms of both his varied artistic experiments and his keen responses to this cultural milieu of modernity.

Lawrence and Victorian Relativity

Einstein published his special theory of relativity in 1905, and his general theory in 1915 and 1916.[2] Even before these publications, the idea of relativity had already been widely, though implicitly, pursued. Lawrence's

contemporary Wyndham Lewis comments in *Time and Western Man*: "Relativity fashion did not commence with Einstein's General Theory—a few of [its] implications can be pointed out" (1993, 7). Lewis does not specify the "implications" of relativity in his work, but the idea of relativity evolving before the publications of Einstein's theory in fact had a variety of implications.

According to *The Oxford English Dictionary*, the word "relativity" means: "The quantitative dependence of observations on the relative motion of the observer and the observed object" (*OED* 2). When the adjective "relative" modifies "motion" in particular, it means: "Arising from, depending on, or determined by, relation to something else or to each other; comparative" (*OED* A. 4. a). These definitions indicate the three essential tenets of relativity. Firstly, "relativity" is primarily based on the idea of a mutual relationship between the observer and the observed object. Secondly, "relativity" is the state of being judged when the observer looks at the object. Thirdly, both the observer and the object are moving relative to each other. It can be said that Einstein integrated these three tenets of relativity into his theory, giving "the sanction of empirical science" to the already existing "philosophical concept" (Whitworth 2001, 131).

Lawrence was familiar with these three tenets of relativity through reading works by Charles Darwin, T. H. Huxley, William James, Herbert Spencer, and Ernst Haeckel. He read their works between 1906 and 1908 while he was studying at University College Nottingham. Critics have often noted how these five thinkers' works led Lawrence to change his view of the world completely.[3] Importantly, Christopher Herbert treats Darwin, Huxley, Spencer, and James as Victorian relativists, suggesting that the idea of relativity is fundamental to their philosophies.[4]

In 1906, Lawrence read Charles Darwin's *On the Origin of Species* (1859),[5] a work in which Christopher Herbert discerns "the coeval bond between evolutionism and relativity" (2001, 51). Darwin's theory of evolution is primarily based on the idea of a mutual relationship, one of the three tenets of relativity.[6] "Mutual relations" is also an expression often used by Darwin himself. In his introduction, Darwin declares that "the *mutual relations of all the beings* which live around us" are "of the highest importance, for they determine the present welfare, and … the future success and modification of every inhabitant of this world" (1977, 6; emphasis added). Interestingly, Lawrence came to use a very similar expression in his later writings. In "Morality and the Novel" (1925), Lawrence states:

> [W]e find that our life consists in this achieving of *a pure relationship* between ourselves and the living universe about us. This is how I "save my

> soul," by accomplishing *a pure relationship* between me and another person, me and other people, me and a nation, me and a race of men, me and the animals, me and the trees or flowers, me and the earth, me and the skies and sun and stars, me and the moon. (1988c, 172; emphasis added)

Here, Lawrence insists on "a pure relationship" to everything, in which he includes not only humans, animals, and plants, but also nations, races, and the universe. It is clear that Darwin's idea that the "mutual relations of all the beings" are "of the highest importance" greatly appealed to Lawrence.

When Lawrence read T. H. Huxley's *Man's Place in Nature* (1895) in 1907, he was exposed to a similar proposition that a variety of relationships should construct the natural world.[7] In his preface to *Man's Place in Nature*, Huxley states that in 1857, two years before the publication of Darwin's *On the Origin of Species*, he had launched into "the whole question of the structural *relations* of Man to the next lower existing forms, with much care" (2001, xxi; emphasis added). When Darwin's *Origin* was published, says Huxley, Darwin's view was "not only in full harmony with the conclusions at which [Huxley] had arrived, respecting the structural *relations* of apes and men, but was strongly supported by them" (xxi–xxii; emphasis added). The vision of an interconnected natural world thus presented by Huxley as well as Darwin surely impacted Lawrence.

Also in 1907, Lawrence read Herbert Spencer's *First Principles* (1862),[8] a book Christopher Herbert considers "one of the most remarkable early manifestos of all-encompassing philosophical relativism" (2001, 25). Spencer's relativism explored here is again based on "mutual relations." "We think in *relations*," Spencer comments, "This is truly the form of all thought" (2003, 162; emphasis added). Spencer terms this fundamental principle "the relativity of our thought" (163). In Spencer's worldview, space, time, matter, motion, and force turn out to be "a relative reality" (165). Spencer further asserts that space is "a relative reality" (165), for "[a]ny limited portion of space can be conceived only by representing its limits as co-existing in certain relative positions" (164). With regards to time, Spencer briefly writes: "a parallel argument leads to parallel conclusions" (165). While space and time are considered "abstracts of the forms of these various realities," matter and motion are "concretes built up from the contents of various mental relations" (169). In comparison to space, time, matter, and motion, Spencer regards force "as the ultimate of ultimates" because "the primordial experiences of Force … supply at once the materials" (169).

The greatest impact Spencer made on Lawrence was through the idea of the "rhythm of motion" (Schneider 1984, 12–17; Muto 2005, 264–7). In

a chapter entitled "The Rhythm of Motion" in *First Principles*, Spencer explains that the universe evolves according to the "rhythm of motion," made possible by the "universally co-existent forces of attraction and repulsion" (2003, 225). This "rhythm of motion" equals "relative motion," another important aspect of relativity. "Relative motion" for Spencer refers to the motion that "the components of a mass have with respect to one another" (281). An "equilibrium" is achieved only when "the relative motions of the constituent parts are continually so counter-balanced by opposed motions" (489). It is well known that this idea of "equilibrium" is one of Lawrence's main concerns in *Women in Love*, where he compares "star-equilibrium" to the ideal relationship between man and woman. What is more, this novel also embodies the process in which two single beings, Ursula Brangwen and Rupert Birkin, move in relation to one another in a fashion akin to "relative motion." *Aaron's Rod*, as we shall see later, centres around the process characterised by "relative motion" between characters.

In the same year in which he read Spencer's *First Principles*, Lawrence read *Pragmatism* (1907) by William James, who Christopher Herbert calls "another philosopher of relativity and a vociferous opponent of 'absolutism'" (2001, 47). What James considers relational and therefore relative in this work is "truth." In his preface to *The Meaning of Truth* (1909), James summarises the basic characteristic of his philosophy in *Pragmatism*: "The pivotal part of my book named *Pragmatism* is its account of the *relation* called 'truth' which may obtain between an idea (opinion, belief, statement, or what not) and its object" (2000, 135; emphasis added). James also states: "Truth here is a *relation*, not of our ideas to non-human realities, but of conceptual parts of our experience to sensational parts" (159; emphasis added). In addition to the importance of the mutual relation, James's pragmatic approach is based on the idea of the observer's point of view, another characteristic of relativity. James remarks in *Pragmatism*: "The world is indubitably one if you look at it in one way, but as indubitably is it many, if you look at it in another. It is both one and many—let us adopt a sort of pluralistic monism" (2000, 11). This idea might remind us of Einstein's proposition in the special theory of relativity, published in 1905, two years before William James's *Pragmatism*. Einstein's special theory of relativity presupposes that a view of everything varies according to one's point of view.

Although this proposition was popularised as Einstein's at the time, it did not originate in Einstein's special theory of relativity.[9] In fact, even before its publication, the idea that the observer's point of view produces a relative vision of the world had been explored in various fields for a long

time. In the field of visual art, for instance, this idea began to be practiced in the so-called "piece of perspective,"[10] or "anamorphosis,"[11] which had become popular in fifteenth-century Europe. The "piece of perspective" is a "picture or figure designed to appear distorted or confused except when viewed from a certain position, or presenting totally different aspects from different positions" (*OED* 1. b). The earliest known example of this is *Leonardo's Eye* (1485) by Leonardo da Vinci. Another well-known example employing this technique is Hans Holbein the Younger's *The Ambassadors* (1533). Seen from a particular angle, this painting discloses the obscure object in the bottom as a human skull. In the late nineteenth century, Paul Cézanne developed this idea and put it into practice in his own way by looking at an object from multiple points of view, incorporating them into one picture. It is well known that Cézanne's style heavily influenced the Cubists, notably Pablo Picasso. Lawrence, who looked at Cézanne's and Picasso's paintings while reading works by authors such as William James, was certainly aware of the importance of the observer's perspective in the new, relativistic view of the world. As will be examined in the following chapters, Lawrence adopted this idea as a practical way to represent his new, relative vision of the world.

Another influential work of William James's on Lawrence's concept of relativity is *The Principles of Psychology* (1890). We do not know whether or not Lawrence read this work, but his *Psychoanalysis and the Unconscious* (1921) includes a comment on "the stream of consciousness" which James expounds in this work. James's idea of "the stream of consciousness" is characterised by the two basic elements of relativity: the mutual relation between objects and their relative motion. In a chapter entitled "The Stream of Thought," James defines human consciousness as "a teeming multiplicity of objects and relations" (1983, 219). He also defines consciousness as "transitive states" or "feelings of relation" (248),[12] presupposing its possibility to change depending on "relation."

William James's view of the self had a powerful influence on his contemporaries, as is well known. James Joyce and Virginia Woolf developed the idea of "the stream of consciousness" into a literary technique in their attempts to represent the internal thoughts and feelings of the self. Lawrence was one of these modernist writers who were profoundly influenced by James's view of selfhood. Daniel J. Schneider has argued that "the idea that life, both conscious and unconscious, is continuous flow and change is paramount in Lawrence's psychology" (1984, 22), and this can be attributed to James's influence on Lawrence. Nevertheless, Lawrence's view of the self becomes different from James's when he places major emphasis on the importance of the human body

rather than the human mind. It can be said that Lawrence changed James's view of the relative self to fit into his own.

In 1908, Lawrence read Ernst Haeckel's *The Riddle of the Universe* (1899), an English translation published in 1901. According to Schneider, this book "would have confirmed much that Lawrence found in Spencer" because it is "a fierce, uncompromising statement of monistic materialism and of the inseparability of chemical or material forces and spiritual or emotional facts" (1984, 17).[13] Haeckel's materialistic monism differs from James's "pluralistic monism," in which the observer's point of view is a crucial factor. James indeed criticised Haeckel's materialistic monism.[14] However, it is still possible to see their worldviews as supporting the same movement of relativism. Haeckel postulates that the universe consists of only one substance that includes two inseparable attributes, such as "God and nature," "body and spirit," or "matter and energy." Furthermore, these two attributes are "in eternal motion," which "runs on through infinite time as an unbroken development, with a periodic change from life to death, from evolution to devolution" (1992, 13).

Significantly, Haeckel's ideas demonstrate the two characteristics of relativity: the mutual relation between two inseparable attributes and their relative motion. The relative motion between these two attributes is exemplified by the idea of the ether. According to Haeckel, the ether is "imponderable matter" while "mass" is "ponderable matter" (229). In addition, the "specific movement of ether," which is "in reciprocal action with mass-movement (or gravitation)," is "the ultimate cause of all phenomena" (228). As will be discussed in chapter one, the idea of the ether has a long history; both in the seventeenth century and in the late nineteenth and early twentieth centuries, the concept of "ether" indicated the medium filling the universe and transmitting light as waves. It was in 1690 that Christiaan Huygens, Dutch physicist contemporary with Rembrandt Harmenszoon van Rijn, first proposed the idea of "luminiferous ether."[15] About two hundred years later, some physicists developed this idea to explore a new, relative vision of the universe, which was entirely different from the vision of absolute space and time explained by Newton. Modern artists also received an enormous impetus from this vision evoked by the idea of the ether. According to Linda Dalrymple Henderson, Umberto Boccioni's *Materia* (1912), František Kupka's *Amorpha, Fugue in Two Colors* (1912), and Marcel Duchamp's *The Bride Stripped Bare by Her Bachelors, Even*, or *The Large Glass* (1915–23) can all be taken as their attempts to represent the concept of the ether (2002, 126, 145).

Along with the idea of the ether, the idea of the fourth dimension reinforced this newly emerging relativistic vision of the universe.[16] It

seems that Lawrence became aware of this idea by 1908, the year when he read Haeckel's *The Riddle of the Universe*. In a letter dated December 22, 1908, he wrote about the fourth dimension: "I do know a fair amount about Life. Life has four dimensions, not two" (1979, 101).[17] Thus, the period from 1906 to 1908 was a formative period when Lawrence read various works by the five Victorian thinkers mentioned above, absorbing their relativistic thinking before encountering Einstein's theory of relativity.

The Emergence of Pre-Einsteinian Modernist Relativity

Einstein greatly contributed to the emergence of the modernist relativism. Though he had published his special theory of relativity in 1905 and his general theory in 1915 and 1916, it took time before the impact of his achievement became recognised. Even scientists mostly neglected the special theory of relativity until 1916, the year when their attention was finally drawn to the general theory.[18] According to Andrew Warwick, A. S. Eddington was the first British scientist who took a sympathetic interest in Einstein's work.[19] Through correspondence with the Dutch physicist Willem de Sitter, Eddington learned of Einstein's general theory of relativity and subsequently "defended and popularized" it in Britain (2003, 447). Due to Eddington's promotion of Einstein's general theory of relativity, British scientists changed their attitude towards it, but the change was gradual and slow.[20] When it came to 1919, Eddington led a British expedition to Principe Island off the west coast of Africa to test one of Einstein's predictions from the general theory of relativity: the path of a ray of light is bent by a powerful gravitational field. During this expedition, Eddington observed the deflection of starlight during a total solar eclipse and verified Einstein's prediction.

November 6, 1919 was an epoch-making date in the history of the reception of Einstein's theory of relativity in Britain as well as in the world. On this particular day, Eddington attended a meeting of the Royal Society and reported the results from the expedition (Warwick 2003, 476). The next day, *The Times* ran the headline "The Fabric of the Universe," which was followed by a detailed explanation of the purpose of Eddington's expedition and its results. Thereafter, Einstein was frequently mentioned in newspapers and magazines, becoming a public figure in Britain (Friedman and Donley 1985, 7–25; Whitworth 2001, 26–57; Henry 2003, 26–30). In 1920, the year following Eddington's expedition, Einstein's theory was for the first time translated into English, and seven editions came out within nineteen months (Friedman and Donley 1985,

17). In the same year, Eddington published *Space, Time and Gravitation* in the United Kingdom and the United States, a book that became one of the most popular accounts of Einstein's physics. In 1921, Einstein himself delivered his first lecture on his new theory at the University of Manchester.[21] Accordingly, Einstein's new vision of the space-time continuum superseded the traditional, Newtonian vision of absolute space and time, causing what Thomas Kuhn calls "a paradigm shift" in the field of physical science.[22]

In Britain, not only specialists in physics but also those who were engaged in other pursuits such as art, literature, and philosophy were greatly influenced by Einstein's physics. This revolution in physics "sent its shock waves into many non-scientific fields and contributed to corresponding changes in the arts and humanities" (Friedman and Donley 1985, 9). In fact, quite a few contemporary writers in Britain, such as Thomas Hardy, T. S. Eliot, and Virginia Woolf, showed enormous interest in Einstein's theory of relativity. Thomas Hardy mentioned Einstein in a letter dated December 31, 1919, long after he stopped writing novels. There, he looked favourably at Einstein's new vision of the universe: "Really after what he [Einstein] says the universe seems to be getting too comic for words" (1928, 353). Later, Hardy actually read Einstein's work in an English translation.[23] Meanwhile, in "Ulysses, Order and Myth," published in 1923, T. S. Eliot referred to Einstein in comparing him to James Joyce in their being pioneers: "Mr Joyce is pursuing a method which others must pursue after him. They will not be imitators, any more than the scientist who uses the discoveries of an Einstein in pursuing his own, independent, further investigations" (1970, 270). Virginia Woolf was well-informed about Einstein's theory of relativity, although she did not read it in great detail until October 1938.[24] Woolf's diary entry dated March 20, 1926 reflects her keen interest in Einstein's theory: "I wanted, like a child, to stay and argue. True, the argument was passing my limits—how, if Einstein is true, we shall be able to foretell our own lives" (quoted in Beer 1995, 303). Furthermore, many of Woolf's works written in the 1930s, such as *The Waves* (1931), were possibly under Einstein's influence (Beer 1995, 303). Finally, in 1925, two prominent philosophers in Britain, Bertrand Russell and A. N. Whitehead, published *The ABC of Relativity* and *Science and the Modern World*, respectively. These were their first responses to Einstein's new physics in book form.

Lawrence left Britain for Italy on November 14, 1919, a week after the first report on Eddington's expedition appeared in *The Times*. He missed the exciting first moments when Einstein received great publicity in Britain. However, by the time Lawrence read Einstein's work in June 1921,

the feverish excitement the theory of relativity stirred in Britain had spread rapidly across Western Europe. The French philosopher Henri Bergson, one of those who attended Einstein's lecture held in France in 1922, raised an objection to Einstein's theory in *Duration and Simultaneity* (1922) (Friedman and Donley 1985, 20; Kaneko 1993, 178–9). It is commonly assumed that the Cubists, who employed the technique of montage and collage, were influenced by Einstein's theory (Childs 2000, 66). Mikhail Bakhtin, the Russian philosopher and literary critic, was also under the influence of the space-time continuum expounded by Einstein when he coined the term "chronotope," which means "time and space" in English. In "Forms of Time and of the Chronotope in the Novel," an essay written in the 1930s, Bakhtin confesses: "This term [space-time] is employed in mathematics, and was introduced as part of Einstein's Theory of Relativity" (1996b, 84). Clearly, Lawrence was one of the first thinkers to respond in a meaningful way to Einstein's theory in Britain and Continental Europe.

Lawrence's Exploration of "Human Relativity"

What is interesting about this modernist relativism is that the paradigm shift in science thus led by Einstein and the shift of understanding on human issues such as selfhood, gender roles, and sexuality interacted with each other. Dennis Brown considers modernism "a movement that radically probed the nature of selfhood and problematised the means whereby 'self' could be expressed" (1989, 1). He describes the newly emerging idea of the self as "fragmenting," by which he means "not a fixed conceptualisation but an active, exploratory process" (2). The shift explained by Brown is, in other words, the shift from the absolute self to the relative self. Importantly, Brown thinks that Lawrence's works, such as *Sons and Lovers*, *The Rainbow*, *Women in Love*, and *Psychoanalysis and the Unconscious*, explore this new view of selfhood. Peter Childs offers a similar view, arguing that, for modernists such as Lawrence, Woolf, and Joyce, "the self was not fixed and stable but evolving, fluid, discontinuous and fragmented" (2000, 51). What Childs calls "evolving, fluid, discontinuous and fragmented" can also be expressed as relative, while "fixed and stable," and absolute. Among the various factors for this shift from the absolute self to the relative self, Brown points out "the rise of the psychoanalytic movement," as well as "the general diffusion of social alienation" and "the disorientation brought about by the shock of the Great War" (1989, 1). Childs also contends that "many Modernists were sufficiently influenced by advances in psychology to change the way they represented human character" (2000, 51). Both Brown and Childs mark

Sigmund Freud as the most influential psychologist on modernists' exploration of the relative self. Yet, the impact of William James's psychology is also of enormous importance.

The end of the nineteenth century is often called a time of "sexual anarchy."[25] The New Woman, a general term for a new type of woman, played a vital role in breaking down traditional gender roles and sexual ideology. The New Woman was popularised in fiction: "Over a hundred novels were written about the New Woman between 1883 and 1900" (Ardis 1990, 4). Among these New Woman novels were Olive Schreiner's *The Story of an African Farm* (1883), Sarah Grand's *The Beth Book* (1897), George Egerton's *Keynotes* (1893), George Gissing's *The Odd Women* (1893), Grant Allen's *The Woman Who Did* (1895), and Thomas Hardy's *Tess of the D'Urbervilles* (1891) and *Jude the Obscure* (1895).[26] Simultaneously, such periodicals as *Punch* and the *Pall Mall Gazette* frequently caricatured the New Woman, particularly her typical conducts, such as smoking, cycling, and wearing bloomers. As Angelique Richardson and Chris Willis put it, "through such powerful visual iconography the New Woman became firmly established as a cultural stereotype" (2002, 13).

The term for a new way of viewing sexuality as relative was "androgyny," which was derived from the Greek words, *andras* (man) and *gyne* (woman). As demonstrated by Tracy Hargreaves, in late nineteenth and early twentieth-century European culture, this idea was "mobilised in different discourses," such as "literary, sexological, psychoanalytic, sociological, feminist" discourses (2005, 3). In the field of sexology, Havelock Ellis published *Studies in the Psychology of Sex* (seven vols., 1897–1928), and Edward Carpenter wrote *The Intermediate Sex: A Study of Some Transitional Types of Men and Women* (1912). These works served as a stimulus for Radclyffe Hall's *The Well of Loneliness* and Virginia Woolf's *Orlando*, both written in 1928. Lawrence's view of sexuality bears striking similarity to Carpenter's and other modernist writers' views.

Significantly, there were quite a few attempts to appropriate the principle of relativity in science to understand the human world. For instance, Herbert Spencer integrated natural and social sciences into a system of philosophy. Notably, his lengthy nine-volume work is called *A System of Synthetic Philosophy* (1862–93). This work treats a wide range of studies, such as biology, psychology, sociology, and ethics, and the foundation of this "synthetic philosophy" is expounded in the first volume, *First Principles*, which, as mentioned above, Lawrence read in 1907. Moreover, William James reconsidered psychology from the viewpoint of physiology.

Contemporary artists were also active in crossing the boundaries between genres to represent their relativistic vision of the world.[27] One of the most remarkable examples of this genre crossing is Pablo Picasso's *Les Demoiselles d'Avignon* (1907) (see Fig. 0.1 below). As Arthur I. Miller has said, "In rejecting the accepted rules and turning to a radically new intellectual framework, he [Picasso] turned to science as a model and mathematics as a guide" (2001, 123). Likewise, Mikhail Bakhtin, as seen above, borrowed Einstein's new physics in formulating his literary theory of the "chronotope."

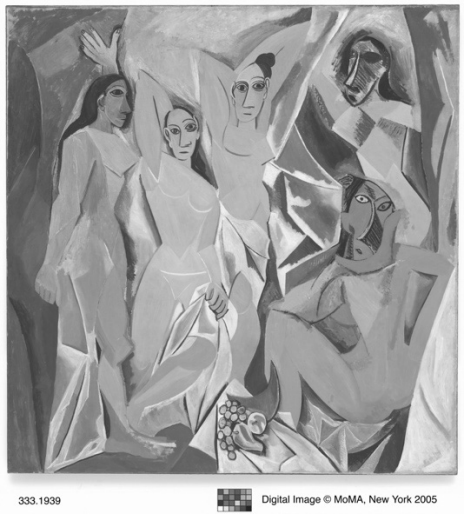

Fig. 0.1. Pablo Picasso (1881–1973): *Les Demoiselles d'Avignon* (Paris, June–July 1907). New York, Museum of Modern Art (MoMA). Oil on canvas, 8' x 7' 8" (243.9 x 233.7 cm). Acquired through the Lillie P. Bliss Bequest. 333.1939. DIGITAL IMAGE © 2018, The Museum of Modern Art, New York/Scala, Florence

Like these contemporary thinkers and artists, Lawrence also tried to adapt the views of the natural and physical world to his own view of the human world. This can be observed in his comments on Einstein's theory of relativity in *Fantasia of the Unconscious*. Immediately after showing his approval for Einstein's new vision of the world, Lawrence abruptly shifts his focus to the issue of human relationships:

> We won't be pinned down, either. We have no one law that governs us.

> For me there is only one law: I am I. And that isn't a law, it's just a remark. One is one, but one is not all alone. There are other stars buzzing in the centre of their own isolation … I am I, but also you are you, and we are in sad need of *a theory of human relativity*. We need it much more than the universe does. (2004, 72; emphasis added)

This passage clearly reveals Lawrence's intention to apply the theory of universal relativity to his own "theory of human relativity." In this regard, Bruce Clarke says that Lawrence "welcomed the theory of relativity insofar as it could be plausibly extended to matters of selfhood" (2001, 211). Jeff Wallace also draws attention to "the modes of linguistic and cultural relativism" featuring Lawrence's "theory of human relativity" (2005, 95). As will be examined in the following chapters, Lawrence treated the issues of selfhood, gender roles, and sexuality on the basis of his "theory of human relativity."

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In order to trace how Lawrence developed the concept of relativity before he read Einstein's work, this book will closely examine the representations of relativity in four of his works: *Women in Love* (1920), *The Lost Girl* (1920), *Aaron's Rod* (1922), and *The Fox* (original version, 1920; revised version, 1922). Finally, *Kangaroo* (1923), the first novel written after Lawrence read Einstein's theory, will be discussed for the purpose of clarifying the influence that Einstein's ideas had on Lawrence's later development of the concept of relativity.

The book will begin with an analysis of *Women in Love*. As argued above, since 1906 Lawrence read various works written by Victorian relativists, through which he had been gradually deepening his understanding of relativity. However, it was not until 1914 that he actually articulated his belief in relativity. In *Study of Thomas Hardy*, written that year, Lawrence often rejects the notion of absolute truth and regards relationships or relatedness as forming a keystone in his worldview.[28] Having acknowledged the importance of relativity in the make-up of the world, Lawrence had difficulty in continuing "The Sisters," which he had started in 1913. Eventually, Lawrence changed its title to "The Wedding Ring," which he finally decided to split into two separate parts in January 1915; they became *The Rainbow* and *Women in Love*. Critics have suggested various reasons for this,[29] while Lawrence only states that "it was so unwieldy" (1981a, 256). A few critics believe that it was due to the inner change Lawrence was undergoing at the time. For instance, F. R. Leavis states that "the Lawrence who started it [*The Rainbow*] has

changed too much" (1955, 169), so that he could not continue to write *Women in Love* as a continuous narrative. Paul Delany offers a similar view. Referring to the composition of these two works, he argues that "in his usual way he wrote out a complete new text, using the earlier material only when it harmonized with his present *mood*—which had, of course, changed radically since 1913–14" (1978, 227; emphasis added). Most likely, one of the events that changed Lawrence's "mood" was the First World War, which broke out in August 1914. Lawrence told Lady Ottoline Morrell how he was feeling when he watched a Zeppelin raid on September 8, 1915: "It seemed as if the cosmic order were gone, as if there had come a new order, a new heavens above us" (1981a, 390). Based on this actual experience, Lawrence wrote in *Kangaroo*: "It was in 1915 the old world ended" (1994a, 216). For Lawrence as well as his contemporaries, the First World War functioned as "a boundary marker in the history of values and attitudes" (Sherry 2005, 4).

It is in *Women in Love* that Lawrence actually presents his new, relativistic vision of the world, which he developed after shifting his "values and attitudes." In April 1916, Lawrence resumed the rest of "The Wedding Ring," completing it in September 1919. The novel, entitled *Women in Love*, was published by Thomas Seltzer in November 1920 in the United States, and by Martin Secker in June 1921 in England, the latter date being when Lawrence read Einstein's theory of relativity in an English translation. Chapter one will demonstrate how *Women in Love* embodies Lawrence's vision of relativity, especially through his use of the elements of light and darkness. This vision will be considered in relation to the idea of the ether, which Lawrence learned about through reading Ernst Haeckel's *The Riddle of the Universe* and by looking at Umberto Boccioni's visual works. Chapter one will also examine the way in which Lawrence creates his vision of "human relativity" by adopting Rembrandt Harmenszoon van Rijn's artistic technique of *chiaroscuro*. It is noteworthy that Rembrandt, the seventeenth-century Dutch artist, became popular again in the nineteenth century, a time when the exploration of light and ether recaptured the public's imagination. Finally, the chapter will present a new way of reading this novel based on the principle of relativity.

Not only *Women in Love* but also *The Lost Girl* and *Aaron's Rod* had been finished before Lawrence read Einstein's work in June 1921. In 1912, Lawrence began to write the original version of *The Lost Girl*, a story entitled "Elsa Culverwell." He developed it into "The Insurrection of Miss Houghton," and then stopped writing it in 1913. After an interval of seven years, Lawrence resumed this story, eventually completing it as *The Lost Girl* in the first week of May 1920. Meanwhile, in 1917, Lawrence started

writing *Aaron's Rod* and continued to work on it at intervals. According to his letters to Robert Mountsier and Curtis Brown (1984a, 730, 731) , both dated June 1, 1921, Lawrence had finished this novel by the end of May 1921,[30] two weeks before he read Einstein's work. In chapter two, which will deal with *The Lost Girl*, Lawrence's way of representing "human relativity" will be discussed in the context of the modernist view of the self. This chapter will read the novel as a parody of the New Woman fiction, a parody in which Lawrence, like Mikhail Bakhtin, uses laughter as the observer's point of view to relativise the absolute self observed in the characterisation of the New Woman heroines. Chapter two will also consider the motif of the stage performance as enforcing the importance of the human body to realise the relative self. Chapter three will treat *Aaron's Rod*, in which Lawrence, like Pablo Picasso, Marcel Duchamp, and H. G. Wells, presents his relativistic vision of the universe through the idea of the spatial fourth dimension. The chapter will also discuss the way in which Lawrence adapts Herbert Spencer's view of the universe and William James's philosophy of pragmatism to establish his own "theory of human relativity."

What is unique about *The Fox* is that Lawrence originally wrote the story in November 1918, approximately three years before reading the book on Einstein's theory, whereas he revised it in October 1921, only four months after reading it. The original version of the work appeared in *Huchinson's Story Magazine* in November 1920. On the other hand, the new, revised version was first serialised in *The Dial* from April to August 1922, and thereafter was published as a book together with two other novellas, *The Ladybird* and *The Captain's Doll* in March 1923 in the United Kingdom and a month later in the United States. In chapter four, the two versions of *The Fox* will be compared in the light of androgyny, which sexologists such as Havelock Ellis and Edward Carpenter explored as a new, relative view of human sexuality.

The examination of these four novels will demonstrate that Lawrence's concept of relativity consists of three fundamental elements: the mutual relationship between the observer and the object, the observer's point of view when looking at the object, and the relative motion of the observer and the object. By studying these elements of relativity in the four works, the book will reveal the great variety of the issues—ranging from the scientific ideas of the ether and the spatial fourth dimension to the human issues of selfhood and sexuality—which attracted Lawrence's attention at the time. The diversity of Lawrence's concepts of relativity observed in these novels can be seen as the outcome of his enthusiastic and varied responses to the highly intellectual cultural milieu of late nineteenth and