Chapter 1

RELATIVISTIC ABSOLUTIVITY

The self-contradiction in the title of this chapter directs attention to the theme of the entire book: Einstein's special theory of relativity, based on the Lorentz transformations, is founded, as first observed by Einstein himself, on two "apparently irreconcilable" postulates–*relative* uniform rectilinear motion and the *absolute* velocity of light emitted by moving sources. The hypothesis of the absolute velocity of light is in fact, on the basis of current experimental evidence, absolutely irreconcilable with the concept of relative motion.

About sixty experiments associated with the *kinematics* of the Lorentz transformations and the Einstein special theory of relativity are critically examined in this book.

Contrary to current consensus there are no experiments in *kinematics* that unequivocally confirm the Lorentz transformations or the Einstein special theory of relativity. It will come as a further surprise, initially sorely taxing the credulity of most physicists, that there are, instead, five different types of experiments that flatly contradict, both qualitatively and quantitatively, the *kinematic* consequences of the Lorentz transformations and the Einstein special theory of relativity.

The wide acceptance of the physical validity of the Lorentz transformations stems also from their application in the dynamics of atomic and nuclear physics, even though kinematics is more fundamental than dynamics. The basis of the dynamics lies in the definitional nature of the concept of velocity-dependent mass. The concept follows as a consequence of the imposition of mathematical form invariance or Lorentz covariance. It has been shown[1] that the specific direct experimental evidence on velocity-dependent mass can be equally well explained (see Chapter 8, p. 143) without ever mentioning the concept of velocity-dependent mass. The experimental evidence on the concept of variable mass is, therefore, not discriminatory in unique favor of Einstein's theory.

The nominal leadership of the society of physicists is so strongly committed to a mistaken and unsupported *belief* in the physical validity of the Einstein special theory of relativity that explicit publication of the contradictory experimental results, in the respected physics journals,

has been very effectively suppressed. It is the primary task of this monograph to present, *out in the open*, this shockingly arresting evidence. No new theory is presented.

The suppression of contrary ideas by the establishment is a well chronicled historical fact that hardly needs reiteration by fresh examples of the autocratic and capricious means of its accomplishment. The suppression of specific experimental results and critiques, not in harmony with establishment beliefs, is a particularly grave situation for the very survival, much less any progress, of physical science.

The Einstein theory protagonists have been most reluctant to examine objectively any critique adverse to the theory, attributing such endeavors to a highly vocal minority of crackpots, if not hopeless cranks. The easy comfort afforded by such intellectually inexpensive ridicule reveals the flavor of the situation. The ridicule has been, however, all too frequently, a case of the pot calling the kettle black. Examples of cavalier and contemptuous comment can be found in some of the very remarks made by Einstein with regard to adverse experimental results and those whom he regarded as antagonists. Contrary to the Einstein legend, it is refreshing to see from his remarks that he was quite subject to the same human frailties as other mortals.

One year after Einstein published his special theory of relativity, W. Kaufmann[2] presented the results of his experiments on the variation of mass with its velocity. "I anticipate," he said flatly that ". . . *the results are not compatible with the Lorentz-Einsteinian fundamental assumptions*." Einstein[3,4] replied the next year in the first of two articles. He conceded that Kaufmann's experimental results seemed free of error. He was wrong. The accuracy of the measurements was inadequate for the support or the contradiction of the variable mass concept. Nevertheless, believing the experiments valid, Einstein correctly stated that more experiment was necessary. He dismissed two other theories, cited by Kaufmann as more in accord with observation, on the rather uncompelling ground that they "are not explainable in terms of theoretical systems which embrace a greater complex of phenomena." In the eyes of his followers, Einstein's attitude may not have been that of "*tant pis*" for the facts. To his opponents it was certainly so, and to those neutrally disposed it must, at best, have seemed dangerously so.

A much more blunt statement by Einstein, betraying an arrogant assurance that his theories were incontrovertible by experiment, can be seen in his letter[5] of March 1914 to his friend Besso, dealing with Einstein's general theory of relativity: "Now I am fully satisfied, and do not doubt any more the correctness of the whole system, may the

observations of the eclipse succeed or not. The sense of the thing is too evident."

Eddington, in 1919, reported that he had successfully found Einstein's predicted stellar displacement effect at the rim of the sun during solar eclipse; his results are currently recognized to be drawn from unsatisfactory observations. Ilse Rosenthal-Schneider, one of Einstein's students at the time, congratulated Einstein on the alleged confirmation of his theory. Einstein responded: "But I knew that the theory is correct." When she asked what if there had been no confirmation—as was, indeed, the case—Einstein responded with the clearest, unmistakably arrogant expression of contempt for experiment: "Then I would have been sorry for the dear Lord—the theory *is* correct" (Ref. 5, p. 653).

Einstein at one time regarded Mach almost reverentially. Mach, a creative, widely influential, maverick physicist, signed the Preface of his book *The Principles of Physical Optics* in the summer of 1913. Mach died in 1916 and the book did not appear until 1921. In it Mach stated: "The reason why, and the extent to which, I reject the present day relativity theory, which I find to be growing more and more dogmatical, together with the particular reasons which have led me to such a view . . . must remain to be treated in the sequel." (There was, unfortunately, no sequel and, in addition, Mach's son Ludwig destroyed his father's papers.)

This posthumous declaration by Mach must have been especially shocking to Einstein, coming, as it did, from a physicist he so admired. This may have had some later effect on Einstein's disengagement from Mach's views. Einstein later inclined toward the opposite views of the ancient Greeks, that reality can be grasped, purely rationally, by thought alone.

Einstein lost little time in depreciating Mach. Although at other times he spoke kindly of him, Einstein is reported[6] to have described Mach as "*un bon mécanicien* . . ." but "*deplorable philosophe*." Mach would not have disputed the first comment. For the last, he was a physicist who enormously influenced philosophy. Years later, in private correspondence,[7] Einstein stated: "There can be no doubt that this was a result of his advanced years, and thus a diminished capability for absorbing facts, since the theory's whole line of thought conforms to Mach's, who is rightly regarded [despite his blunt denial] as the forerunner of the invention of the theory of relativity." Einstein was much kinder in commenting on his own senility: "I grasp things in a broad way easily. I cannot do mathematical calculations easily" (Ref. 7, p. 658).

There was one message that Mach conveyed with telling effect. It was the denial of absolute motion. Einstein's acceptance, as a first postulate, that all uniform rectilinear motion is relative would certainly have been in accord with Mach the relativist. Einstein's second postulate of the absolute speed of light—independent of the relative motion of its source—may have seemed to Mach, a true relativist, to be untenably paradoxical. Einstein's proponents would quickly point out that Mach should not so naively rely on his common sense (in this uncommon-sensical paradox), which only serves to deceive him. Einstein, however, felt no notable restraint on his own common sense in his letter to Besso, as one example, that "the sense of the thing is too evident," whatever experiment may or may not prove.

It may also have seemed to Mach that there had developed an exuberant euphoric intoxication with mathematical virtuosity and the metaphor of an algebraic (fictitious rather than physical) four-dimensional representation of the Lorentz transformations. It seemed seductively conducive to the metaphysical delusion that the enthusiastic incantation of the mere vocabulary of geometry produced new experimental results —not to even mention brand-new philosophical and theological irrelevancies. This abomination (in a metaphysical sense) gave birth to such magical phrases as *world* lines and *world* points, rather than simply lines and points, in a graphical representation whereby the slope of a (world) line, with the distance and time axes interchanged from the familiar Cartesian representation, no longer represented velocity, but, instead, its reciprocal.

Einstein noted: "Since the mathematicians have attacked the relativity theory, I myself no longer understand it any more." On another occasion he said: "The people in Göttingen [noted for its mathematicians] sometimes strike me, not as if they wanted to help one formulate something clearly, but as if they wanted only to show us physicists how much brighter they are than we" (Ref. 7, p. 159). Whatever may have been the spirit in which these comments were made, Einstein later "got religion" as expressed in his remarks: " . . . nature is the realization of the simplest conceivable mathematical ideas. [Simplicity, like the subjective esthetic beauty, resides in the eye of the beholder.] I am convinced that we can discover, by means of purely mathematical constructions, . . . the understanding of natural phenomena . . . . But the creative principle resides in mathematics. In a certain sense, therefore, I hold it true that pure thought can grasp reality, as the ancients dreamed."[8]

These examples of Einstein's comments do indeed tend to disparage Einstein the legend (for an opposite, at times apologetic, point of view

see the whole of Ref. 5). Einstein the man is seen to be all the more human as a fallible man among men, just like the few members (Larmor, Lorentz, Michelson, and Poincaré on special relativity–Brillouin and Planck on general relativity) of the "highly vocal minority" of his antagonists who also put their pants on one leg at a time. Einstein's comments serve to show his disposition toward mathematics, toward his theories, toward experiment (particularly if it is adverse), and toward sharp ridicule of his opponents. In legend, he was most charitable. The need to demonstrate the denigration of opposition by the harsher and often brutal examples of the totalitarian, intolerant behavior of his disciples is thankfully avoided. The protagonists, in their vested emotional identification with Einstein and his theories, have set themselves up as self-anointed and righteous defenders of, what will be seen to be, a physically unsupported faith.

This book is a constructive challenge to their misguided faith. Will they have the personal and the scientific integrity to accept the challenge objectively? Such an open attitude in the past would have made this, now mutually painful, book unnecessary. Will they, instead, now remain intransigent in a conspiracy of silence? Perhaps they may now cease to call into question the motives (if not the sanity) of their truly "loyal opposition" and look critically to their own.

The experimental basis of Einstein's general theory of relativity (actually a theory of gravitation) is *not* currently regarded as inescapably conclusive. The most recent efforts hinge on the measurement of the oblateness of the sun, about which no definitive conclusion seems forthcoming. As a consequence of the awareness of such experimental indecisiveness, it is now fashionable to admit to print "heresies" that dare even to challenge the consistency of the theory itself, and in so doing indirectly and subtly suggest the possible invalidity of Einstein's special theory of relativity. No comparable liberality (if such a euphemism is not excessively offensive) has yet blossomed for direct critiques of Einstein's special theory of relativity, even though the experimental foundations of its kinematics are grudgingly recognized, by a knowledgeable few, to be quite poor.

The current attitude toward the theory and adverse experiment dealing with it is typically represented in a recent past statement of editorial policy[9] in the *American Journal of Physics*, "devoted to the instructional and cultural aspects of physical science" to suit "the interests and needs of college and university physics teachers and students." It reads in part: "Papers presenting original research that clarifies past misunderstandings [abundant in relativity] . . . are

certainly acceptable." This is next qualified with the clearest explicit intention of the establishment, whenever and wherever it can, to maintain the status quo:

> Controversial or isolated results yet to be judged in the research literature [where they also have as much chance of appearing as does a snowball of retaining its integrity in boiling water] are not acceptable. Included in the latter category are papers purporting to discredit bodies of physical theory (such as special relativity, quantum mechanics, and thermodynamics) which are a part of the generally accepted physics curricula. Although these theories are not necessarily complete and immutable, a serious criticism of them is more properly [no matter how simple] presented to the appropriate specialist audience.

Any new result, theoretical or experimental in particular, is, by its very nature, initially controversial. The assertion that only a specialist, with his inherent vested interest, is alone appropriate to pass on the merits of a new result, for the rest of the unwashed masses, is nothing more than a circumlocution for insult to the intelligence without malice. In other words, the community of physicists and teachers, in particular, must be "shielded" or "protected" by the establishment from exposure to certain thought-stimulating ideas to which they might in turn expose (perhaps even infect) their students, who are the very ones most in *need* of such exposure for the development, in their formative years, of an ever alert critical faculty; in other words, in the hushed vernacular of the establishment, don't bother us ("*tant pis*") with facts, our minds are already made up. The editor in 1976 brought forth a slight, but important, modification of the editorial policy of his predecessor. Short letters, contrary to current consensus, may at the editor's discretion be admitted to print. No comparable statement of "accommodation" concerning a consideration for the publication of regular articles is made.

Einstein based his general theory of relativity on two explicit assumptions. One was a demand for mathematical form invariance or covariance. Einstein[10] conceded, as Kretschmann[11] first noted, that mathematical covariance was without physical consequence. This assumption of covariance was a generalization of the property of mathematical form invariance exhibited by the Maxwell-Lorentz differential equations of electromagnetics under the Lorentz transformations.

The full import of Kretschmann's observations, concurred in by Einstein, seems for some astonishing unknown reason to have escaped the recognition that covariance under the Lorentz transformation is also without physical consequence. Why does it continue to escape suspicion that the Lorentz transformations may also be devoid of physical

kinematic content, derivable, as they are, from the postulate of mathematical covariance, itself, admittedly, empty of physical significance? As Einstein[12] put it: "This demand [covariance] by itself is of course not sufficient to serve as a point of departure for the derivation of the basic concepts of physics."

Larmor[13] said of Einstein's special theory of relativity:

> It was reached independently by more universal reasoning, electrodynamics being only an illustration, by Einstein, fortified in his views strangely by the principles of E. Mach, that in science we must build on what we observe and not analyze beyond the range of our direct sensual perceptions. He founded his general argument on a mysterious postulate, that translation applied to the system does not affect at all the velocity of radiation relative to it [absolute speed of light], which remains the same as when measured in the original resting frame of reference. This might well appear to be a pure paradox, until it acquires an interpretation as the statement of an algebraic correspondence [by which was meant covariance], between frames as above, but masquerading in the language of kinematics.

The paradoxical masquerade of Einstein's "mysterious postulate" of absolutivity does somewhat hide the empty physical content of its equivalent identification as covariance.

Larmor's taste ran to covariance and absolute motion in an ether reference frame rather than Einstein's "mysterious postulate" of absolutivity. Sommerfeld[14] noted, of Einstein's postulate of the absolutivity of the speed of light from a moving source, that it was "the only valid *remnant of the* [superfluous] *ether concept.*" Pauli[15] said of this absolutivity hypothesis: "It proves to be the true essence of the old aether point of view."

The Einstein theory proponents would hold that even if covariance is a physically empty imposition and even if theory should turn out to be contradicted by experiment, the theory would yet remain a logically elegant creation of the human mind. With this there can be no argument, for the same can be said of the Aristotelian syllogism which deals with propositions in terms of their form rather than their content. And yet where the syllogism is in the sense of form logically immutable, the Lorentz transformations, it will be shown, are an unrecognized deception for the trivial identity transformations of statics masquerading as kinematics, in which the symbol for relative motion that appears in them is an unrecognized identity for zero.

Enough of polemics, let attention now be fixed on deeds. It will now be shown that the Lorentz transformations are kinematically untenable. This will be done in a short, straightforward manner that will circumvent

the mistaken metaphysical pieties that have been used in the past to rebut refutations of the special theory of relativity.

It is a well known, almost trivial, property of the Lorentz transformations,

$$x'' = (x' - wt')/\sqrt{1 - w^2/c^2} \quad \text{and} \quad t'' = (t' - wx'/c^2)/\sqrt{1 - w^2/c^2}, \quad (1a,b)$$

that at the initial kinematic spatial coincidence of the origins, $x'' = 0$ and $x' = 0$, the corresponding time coordinates in each system are, only at this particular momentary spatial coincidence, equal to each other and to zero: $0 = t'' = t' = 0$. This is a specific case of a simple but more general algebraic property of the Lorentz transformations. It is not equally well appreciated that there are subsequent *unique nonzero* time coordinates that are equal to each other, $0 \neq t'' = t' \neq 0$, only at the momentary kinematic ($w \neq 0$) spatial coincidence of certain *unique nonzero* position coordinates identified by the equality $0 \neq -x'' = x' \neq 0$, as may be directly verified in (1a,b).

Consider now a specific synchronous instant $t = t_a > 0$ at x_a, and everywhere else in a third nominally "stationary" unprimed system. The specific *nonzero* coordinates t'_a ($=t_a=t$) at $-x'_a$ ($=x_a$) are determined by the transformations:

$$x'_a = (x_a - vt_a)/\sqrt{1 - v^2/c^2} \quad \text{and} \quad t'_a = (t_a - vx_a/c^2)/\sqrt{1 - v^2/c^2}. \quad (2a,b)$$

The equality $-x'_a = x_a$ together with (2a) determines

$$x_a = vt_a/(1 + \sqrt{1 - v^2/c^2}) = -x'_a. \quad (3)$$

The symbol v, in the Lorentz transformations, is the positive *nonzero scalar speed* magnitude of the *vector velocity* of the uniform translation of the primed system, relative to the unprimed system, along the positive x-direction; x_a in (3) is a positive scalar quantity, since $0 < v < c$.

Consider next the double-primed coordinate system translating uniformly in the positive x-direction with a *nonzero scalar speed* $u \neq v$. At the same specific synchronous instant $t = t_b = t_a > 0$ at x_b, and everywhere else in the "stationary" unprimed system, the specific double-primed coordinates t''_b ($=t_b=t_a=t$) at $-x''_b$ ($=x_b$) are prescribed by the transformations:

$$x''_b = (x_b - ut_b)/\sqrt{1 - u^2/c^2} \quad \text{and} \quad t''_b = (t_b - ux_b/c^2)/\sqrt{1 - u^2/c^2}. \quad (4a,b)$$

The equality $-x''_b = x_b$ and (4a) determines

$$x_b = ut_a/(1 + \sqrt{1 - u^2/c^2}) = -x''_b; \quad (5)$$

x_b is a positive scalar quantity, since $t_b = t_a$ and $0 < u < c$.

The equalities $t''_b = t_b = t_a$ and $t'_a = t_a$ require the equality of t''_b (at $-x''_b$) and t'_a (at $-x'_a$). This unique temporal equality, $t''_b = t'_a$, (in specific correspondence *only* for the synchronous instant $t = t_a = t_b$) has been shown to happen as an algebraic characteristic of the Lorentz transformations, between the single-primed system and the double-primed system, only at the momentary kinematic spatial coincidence of the position coordinates $-x''_b$ and $-x'_a$ in required accord with the equality $-x''_b = x'_a$. The straightforward logically imposed deduction of the equality $-x''_b = x'_a$ can be satisfied only if the positive scalars v and u in (3) and (5), respectively, are each identically zero, since $t_a \neq 0$. The internal logical contradiction is that v and u are kinematically assumed to be nonzero only to be deduced to be identically zero, as a consequence of a simple unique algebraic property of the Lorentz transformations.

It is also a "conjugate" algebraic property of the Lorentz transformations that, for both zero and nonzero values of the coordinates, there are the paired equalities $x'' = x'$ and $-t'' = t'$. Find analogously, $x_d = vt_d/(1 - \sqrt{1 - v^2/c^2}) = x'_d$ and $x_e = ut_d/(1 - \sqrt{1 - u^2/c^2}) = x''_e$. The "conjugate" equalities $-t''_e = t_e = t_d$ and $-t'_d = t_d$ yield $t''_e = t'_d$ whereby, according to the Lorentz transformations, $-x''_e = x'_d$, and, therefore, $u = 0 = v$. The general algebraic property of the Lorentz transformations wherein their kinematic untenability resides is the pair of equalities $\pm t' = t$ and $\mp x' = x$.

The next two chapters of this monograph deal with critique of theory. The succeeding five chapters deal with critique of experiment. The intensely loyal Einstein theory protagonists would do better, at first, to skip the next two chapters, since an awareness of the actual experimental aspects of the theory can only induce a mellowness that tempers a possible prejudice with ideas so contrary to strongly prepossessed concepts.

The various chapters are made up, for the most part, of articles that were deemed unsuitable for publication in the widely circulated physics journals. The reader may judge their suitability for himself. There is some tendency to repetition of some theoretical points in the experimental parts. An advantage of this is that the critique of theory and the critique of experiment can be read independently of each other. In addition, each chapter can, if desired, be read independently of its bearing on the other chapters.

The mathematically unsophisticated need not be awed by the subject matter of this book. The mathematical skill required to comprehend the presentation does not exceed elementary calculus, relying for the most

part on simple trigonometry and algebra. The purpose was not to thereby depreciate higher mathematics, but to accentuate the physics without the often distracting dazzle of mathematical elegance.

To the temperate protagonists and to the neutrally disposed, these critical presentations will undoubtedly cause surprise. These readers may find much of the critique valid; they may agree that the Lorentz transformations are physically and logically untenable. Such a reader will certainly become aware that he has been the victim of a reprehensible form of unrecognized thought control, due to an establishment system of censorship that insults the intelligence and does nothing but harm to scientific integrity and progress.

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