of implementation, it was necessary to balance a number of factors. The RDS specification provides for a wide range of features, many of which would require a considerable continuing input to render a viable service. Similarly, receiver manufacturers were feeling their way, and looked for a package of features which would get the service off the ground, without involving an excessive amount of development.

It was also becoming clear that the first RDS receivers were going to be car radios. Accordingly, the BBC planned to implement a set of features which would optimize the benefits obtainable from an automatically tuned car radio. In fact, these are the same features which would be required by an intelligent receiver, and so are in no way dedicated to in-car application. Additionally it was decided to implement the Clock Time and Date feature, since this could be done at little additional capital cost, and involved no continuous operating expenditure.

The RDS codes involved in automatic tuning are PI, AF and ON and of course PS is also included to give a positive read-out of the station name. In the case of the BBC networks, the information for these codes is generated centrally, and fed to the RDS encoders at transmitters by data links. In this way, the codes can be changed dynamically, which is necessary when, for example, the v.h.f. and m.f. services are 'split'.

CT is derived at each encoder site from a clock circuit which derives its reference from the low-frequency 'MSF' transmissions from Rugby.

Phased implementation. It became clear early in the planning period that it would not be practicable to muster the necessary resources to equip the whole of the BBC's network simultaneously. However, the nature of RDS is such that it is vital for all the services receivable in a particular area to be coded, otherwise the intelligent receiver will have 'blind spots'. Having made the decision to spread the implementation geographically, rather than by service, it followed that the logical first phase was to cover England. In England, the pattern of broadcasting is less complex, with four national networks almost universally available, and the local radio chain forming an effective 'fifth network'.

Now that this first phase is virtually complete, planning effort is being devoted to solving the complexities of coding the various regional and 'opt-out' services which are broadcast in the national regions (Scotland, Wales, Northern Ireland) with a view to completing the installation programme in a single second phase through 1988/9.

Travel information and RDS. The possibility of providing an ARI[3]-type travel information service using the RDS equivalent codes has been mentioned earlier, and the BBC has been conscious of considerable interest by the car radio industry in this feature. From the BBC's point of view of course, the car radio audience is a minority, albeit an important one, and it would not wish to commit itself to providing a service which did not measure up to the normal yardsticks of a public-service broadcasting organization. The use of the ARI system in West Germany has been studied, and of course an important difference is the way in which all radio broadcasting is regionalized. This allows stations to broadcast traffic flashes which are at least partially localized.

In the case of BBC Radio, the obvious channel to use as the primary channel for traffic flashes is local radio, and it is along these lines that preliminary planning is taking place. It is planned to conduct a limited experiment next year whereby a group of local radio stations will be equipped to radiate the TA and TP codes, which will also be linked into the BBC network services, so that a listener to, say Radio 3, could choose to have the programme interrupted by traffic flashes from the local stations in the area he was passing through. There are various technical and editorial problems to be solved, but if successful, there is no reason why the service should not be extended nationwide in due course.

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Relativity – a critique

A typical relativist's exposition of the twins effect is scrutinized with a greater attentiveness than could normally be expected of either a confirmed relativist or the ordinary intelligent lay reader

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In his book Space and Time in the Modern Universe, Paul Davies gives a detailed exposition aimed at showing the layman that the twins 'paradox' is not in fact paradoxical. As an authority on special relativity, Professor Davies is surely as recognizable as most are (at the very least, for the purposes of such an exposition), and does give an impression of total confidence in knowing exactly what he is saying and why he is saying it. Or at least, this would probably be the impression for most or all lay readers, while specialists confident in his qualifications would in general probably feel little if any need to read the exposition at all. Nevertheless, there are certain criticisms that one could at least *seem* justified in putting to him, or to a similar authority: and in such a connection, perhaps merely to seem justified is to be so, if only educationally.

In the situation described, twin A leaves twin B on Earth, travels to a star 10 light years distant, and promptly returns. His relative speed throughout is a uniform 0.9 c, the periods of acceleration and deceleration being regarded as negligible. Davies proceeds on a basis of describing what he would expect each twin to see occurring to the other's clock rate, both relativistic and Doppler/time-lag effects being taken into account. A, then, takes 11.1 years Earth time to reach the star, 4.84 years ship time elapsing in accordance with the formula $\sqrt{(1-v^2/c^2)}$; his arrival there being seen by B 21.1 (i.e. 11.1+10 signal-lag) years after his departure. Since in this 21.1 years B sees 4.84 years A time elapse, A's clock appears to B to be working 4.36 times slower than his own; 2.3 of this being 'due to the relativistic time-dilation effect'. Now, on pp.42-3, Davies states: 'To determine what A sees of B and his clock during the outward journey, note that the observations must always be perfectly symmetric between two inertial observers according to the principles of special relativity, which enable us to regard equally the situation that it is really A at rest, and B receding at 0.9c. Consequently, A will see events on Earth running 4.36 times too slow (again 2.3 due to relativistic time dilation). Because A reaches his destination after 4.84 years on his clock . . . should he look back at Earth at the moment of arrival, he will observe events occurring only 4.84/4.36=1.1 years after his departure.'

This is a very interesting passage. One can agree (see presently) that there is symmetry in the sense that each observer sees a reduction by a factor of 4.36 in the other's clock rate: but this symmetry is of a secondary nature, being in respect of the extent to which different amounts of observed time evince reduction – A, as indicated, seeing 1.1 years Earth time elapse in 4.84 years spaceship time and B seeing 4.84 years ship time elapse in 21.1 years Earth time. The layman at least could be forgiven, were he wrong, for remarking that a principle of perfect symmetry – and so special relativity, assumably – should require that each observer, during the periods of uniform relative motion, sees the same reduced-amount of time elapse for the other. Even could no other criticism be made, one could feel justified in suggesting that Davies has a case to answer. He could be accused of keeping mentally separate the idea of perfect symmetry he asserts and the manifest asymmetry he describes. However, he would perhaps be unlikely to feel that his position was seriously threatened. He himself finally acknowledges that an asymmetry is involved, as of course he must if he is to have an asymmetric outcome and not have a paradox. He ascribes this outcome to the fact that it is only A who undergoes acceleration and velocity reversal. The question of whether he is right to do so, which is not quite a straightforward one, will be treated of after further asymmetric aspects of his exposition have been pointed to – aspects upon which this question would seem to have no bearing.

According to Davies, as noted, A on arriving at the star sees 1.1 Earth years having elapsed. Considering 4.84/4.36, one can say that he indisputably does involve the formula $\sqrt{(1-v^2/c^2)}$ in obtaining this apparent period; and thus he gives the impression of obtaining it *by* doing so. However, (as will be seen forthwith) 1.1 years can be expected solely, merely, on account of being the difference between A's transit time and that of light, under an implicit assumption on Davies's part that real values for these times are those according to B, 11.1 and 10 years respectively, rather than to A. While 4.84/4.36=1.1 may be seen simply as the division of a given period by a given reduction factor, it is surely far from irrelevant to note that 4.84 years is itself derived by application of $\sqrt{(1-v^2/c^2)}$, i.e. to 11.1 years B time. Taking account of this (and choosing to express 1.1 as 11.1–10), one may say that 4.84/4.36=1.1 expresses:

$$\frac{11.1.\sqrt{(1-v^2/c^2)}}{(11.1+10)/\left(11.1.\sqrt{(1-v^2/c^2)}\right)} = 11.1-10, \qquad (1)$$

i.e. a relation of 11.1+10 to 11.1−10; which simplified, and substituting t for 11.1 and k for 10, is:

$$\frac{t^2(1-v^2/c^2)}{t+k} = t-k \qquad (2)$$

Now, it is a quite general truism that any pair of quantities x+y, x−y are related thus:

$$\frac{x^2z}{x+y} = x-y$$

where z (since $x^2z=x^2-y^2$)

$$=\frac{x^2-y^2}{x^2}$$

$$=1-y^2/x^2;$$

which in the case of t+k, t–k is $1-k^2/t^2$, which in turn must of course equal $1-v^2/c^2$, since v varies as 1/t. One may say that Davies's implicit application of $\sqrt{(1-v^2/c^2)}$ to A's transit time is no effective application of this factor as such, being effectively merely part of an application of $1-v^2/c^2$ to 11.1^2, as (1) and (2) imply.

Even if the assymmetry of transit times is ignored, Davies can still be seen to treat A and B in qualitatively different ways. If A is really granted his relativistic right to say that 4.84 years is indeed 'B's travelling time', and exercises it, and agrees that the relative speed is 0.9c, then he must assume that light's transit time is 0.9×4.84=4.36 years. Were Davies to treat A as he treats B, he would have A seeing B's completion of the outward phase after 4.84+4.36=9.2 years A time, 4.84/2.3=2.1 years B time. The apparent-retardation factor 4.36 would still apply, in this case resulting from 9.2/2.11. So: (4.84+4.36)/4.36=2.1 years, as would correspond to (11.1+10)/4.36=4.84 years in the case of what B sees: but of course, Davies divides just 4.84 by 4.36.

Were Davies's treatment of what A should see thus similar to his treatment of what B should see, he would of course then be faced with two different amounts of Earth time elapsing on Earth during the outward phase of the experiment. Clearly, one may say that of these values, 11.1 and 2.1 years, only the former need be seriously considered, seeing that the latter is ultimately derived from it: but to deny thus the reality of the latter is to deny A his relativistic right to say that it is B who recedes at 0.9 c, and so is implicitly to deny the relativity postulate. What also would be incompatible with Davies's treating A in the manner in question, of course, is that for A's observation of B's clock rate to be uniform for 9.2 years, he wold like B (B for 21.1 years, i.e.) have to remain unaccelerated for this period. This alone would violate the definition of the experiment, as also would what would make it seem otherwise the same, namely appropriate acceleration of the Earth and the star (ignoring the rest of the universe) so as to achieve velocity reversal relative to A. This serves to confirm the importance of the question of who undergoes acceleration(s); an importance, however, then, associated with an apparent implicit denial of the relativity postulate.

By now, anyway, one can readily appreciate that the 1.1 years A sees having elapsed on Earth cannot be derived through treating A in the same manner as B: so it is reasonable to assume that this value will not be obtainable in any way other than that conveyed in equation (1) above, and that that equation is indeed the only true expanded version of 4.84/4.36=1.1. In other words, 1.1 years really does represent 11.1–10 years, so that A's observation depends entirely on periods occurring in B's reference frame; 11.1–10 years, moreover, necessarily considered as a natural concomitant (in the situation described) of B's observed period of 11.1+10 years. Regarding 21.1/4.84=4.36=4.84/1.1 in the light of these considerations, one may say that the secondary 4.36 symmetry actually depends upon the primary asymmetry Davies allows.

One further asymmetric feature to note is a simple qualitative difference between A and B as regards the way in which the $\sqrt{(1-v^2/c^2)}$ clock-slowing contributes to the factor 4.36–which without it would be greater for A (i.e. 11.1/1.1) and smaller for B (i.e. 21.1/11.1). And of course – the very obviousness of which perhaps has tended to help it evade subtle scrutiny – only A is affected by this real retardation, in the situation described, *as* described, by Davies.

The impartial reader may now feel that Davies does have some explaining to do, regardless of whether he is right to ascribe the asymmetric outcome to A's changing reference frames through acceleration; that whilst he is describing an effect predicted by special relativity, he is not doing so in such a way as could be said to illustrate Einstein's (special) relativity postulate, for all his assertion of symmetry. During an instance of uniform relative motion, 11.1 years elapse in one reference frame and 4.84 in the other. In a more technical work, his ascribing the asymmetry to acceleration would presumably have involved invoking general relativity (though if he would have been right to do so, he could at least be censured on educational grounds, for stating: 'acceleration is absolute in special relativity' (p.44): thus conveying to the lay reader the impression that acceleration is indeed in special relativity, when it is not). But invoking general relativity could not have vindicated him, if one may judge from David Bohm's corresponding discussion in his own The Special Theory of Relativity.[2] Bohm (who in contrast to Davies stresses asymmetry throughout) says: 'The conclusions of (special relativity) evidently cannot be applied symmetrically in the frames of both observers, since one of them is accelerated and the other is not', and goes on to say: '. . . the different degree of "agings" *(sic)* of the two twins is fully compatible with the principle of relativity, when the theory is generalized sufficiently to apply to accelerated frames of reference' (pp.166-7). His speciousness, such as it is, can be said to depend upon an ambiguity of the word accelerated: which can mean either 'being accelerated now' or 'moving faster, having been accelerated' (in this case, i.e., faster than zero speed). The first meaning, at least, affords apparent justification for invoking general relativity; but only the second can apply to the whole experiment considered, since Bohm too specifies negligible acceleration periods. He cannot be actually using the first meaning, since he states that special relativity holds for the Earth observer: as it could not do, were the slower-aging effect confined to the acceleration periods (as anyway, of course, would be out of the question). So, he is definitely using the second meaning: but this cannot justify invoking general relativity, since the 'accelerated' spacecraft is in uniform motion. Or if he *is* saying that general relativity has to be applied even in this case, then he implies that special relativity may never be symmetrically (and so never properly) applied: since the spacecraft, its uniform transit speed attained, could not be different from one that happened to be passing Earth at the same speed. How could it 'remember' that *its* was the accelerated frame?–Unless the absolute difference arising during acceleration were retained during uniform motion: as, then, Bohm implies, and as indeed Davies does. Both authors are compelled by special relativity's internal logic to say that there will be differential aging due to relative motion *per se:* but to get an asymmetric result, they are also compelled to associate this effect causally with the only apparent kinematic difference between the twins, namely the traveller's acceleration(s). But if they say that it is due to acceleration *per se*, they make relative motion *per se*, and thus special relativity even for the Earth observer, redundant. A solution to their problem is not hard to see, but for them as relativists may be so unwelcome as to be very much so. Namely, that what they have implied is indeed the case: the acceleration does render the resulting two inertial reference frames non-equivalent: as suggests the idea of absolute motion, upon an assumed meaninglessness of which, of course, special relativity as such depends. Let the prospect, then, be considered as unequivocally as possible:

(i) The relativistic or 'relativistic' clock-slowing effect, of which the differential aging of A and B is a manifestation, is due to relative motion.

(ii) This differential ageing, being an absolute effect, must be causally associated with the only other perceptible absolute difference between A and B, namely the former's being accelerated.

(iii) Regarding (i) and (ii), it could tend to seem that the differential ageing is being ascribed to two different causes in a way implying that (i) and (ii) cannot both be right: but given that both are right, such contradiction cannot be the case. The 'different causes', then, must be regardable as aspects of one causation. The only imaginable way in which this can be so appears in that, quite simply, A's acceleration is the cause of his motion relative to B. I.e., merely, acceleration has its effect through the relative motion it creates; an effect that persists after it itself has ceased and the motion is uniform. But this effect is an absolute one. One should, then, see no option but to say that an absolute effect is being had by uniform relative motion.

(iv) Such motion, therefore, here, cannot validly be regarded as merely relative, of A to B, in the orthodox Einsteinian sense: there is about it, however elusive, something corresponding to the idea of absolute motion.

Davies is right about acceleration: but not as a relativist.

Lastly as regards acceleration, a few words on the question of velocity reversal; which is of course but an aspect of the acceleration question, since the real clock-slowing is the same in both directions. Davies, however, tends to give the impression that it has some independent or additional significance, when on p.44, concerning the return journey, he says: 'The abrupt reversal of A's velocity means that although the clock rates are equally slowed and speeded by a factor of 4.36 for both A and B, A sees the speeded-up period occur for half his journey, whereas B sees this period occur for only the last 1.1 out of the total 22.2 years' trip. Hence their clocks must get out of step'. But since they must get out of step in any event, owing to relative motion, the observational circumstances determined by the velocity reversal must be regarded as incidental, if inevitable; they would get out of step even could B observe the speeded-up period for half the 22.2 years. The 1.1 year period is of course the inevitable natural compensation for the 21.1 year slowed-down period of B's observing the outward journey, ensuring that the clocks get out of step to no other extent. By stressing as he does the importance of what is seen by A and B, here, Davies tends to give the impression–to the lay reader at least–that the illusory Doppler portion of observed retardation contributes to the end result.

The implication that Davies is effectively not a relativist at all, in his exposition, and that the correctness of his description actually depends on his not being one, may tend to

"What is also surely a valid option is the naive inference by one from whom light rays are receding in opposite directions, that they are at 2c relative to each other"

seem incredible to much of a non-specialist readership in spite of the criticisms conveyed. He might, then, rely on silence in the face of them, so as to imply that they are beneath authoritative refutation. However, he surely can be said to have an educational duty to show clearly, if he can, that they are ill-founded and that he can indeed properly be called a relativist, in the sense of one who rigorously applies the relativity principle; for even if he does not imply absolute motion, it is clear that the impression of his doing so could be given to at least some readers of his exposition, especially the forewarned. No relativist, as such, would wish this impression to be given: if Davies cannot be seen successfully to defend his own position, perhaps other authorities will feel constrained to show that they themselves are relativists. But if it is the case not only that he implies absolute motion, but also that his exposition is essentially such as would be given by any similar professional and that paradox can be avoided in no other way, then one will be justified in saying that there have never really been any true relativists. Their dealing with real effects predicted by special relativity would surely not be sufficient reason for retaining the title 'relativist', if the idea of absolute motion were reinstated and (so) the relativity postulate abandoned.

There seems no good reason for regarding this abandonment as incompatible with the experimental evidence to the prediction of which it leads. It is possible to make the right prediction for the wrong reason. In any event, the idea that this evidence as such confirms special relativity as such is demonstrably muddle-headed. The latter entails a symmetry of counterbalancing asymmetries; and Earth clocks and masses have not been observed from the reference frames of high-velocity particles in the experiments in question. To take the evidence from only Earth's reference frame as confirming special relativity as such is implicitly to adopt the argument:

(i) if both the required asymmetries are the case, then that for this reference frame is so;

(ii) the asymmetry for this reference frame (as the evidence shows) is the case;

(iii) therefore, both asymmetries are the case

–which is a straightforward instance of that quite basic error in logic, 'the fallacy of affirming the consequent'.

If absolute motion is the case, no other situation would seem imaginable than that the Earth has such a low absolute speed compared with light as to be virtually at absolute rest by this comparison, which of course is the one that matters where $\sqrt{(1-v^2/c^2)}$ is concerned: which situation coincides, for terrestrial observers, with the relativist idea that any inertial observer's claim to be at rest is as good as that of any other moving uniformly relative to him. Considering the enormous and contrived energy expenditure required to accelerate even moderately sizable bodies to significant fractions of c, it would hardly be surprising if in the case of planets such speeds were virtually or altogether absent from the universe. In immediate response to this, it might be said that such speeds, and of whole galaxies relative to each other, are very common – i.e., where these galaxies are greatly separated even by cosmological standards. But if the implication of absolute motion is unavoidable, then the idea (or fact-image) of cosmological red-shift's betokening recession of galaxies itself falls under the gravest suspicion: since it would then imply, unconscionably, that our galaxy is at or near a centre of cosmic expansion. That the expanding-universe model has for so long been generally regarded as factual, and that so much professional theorizing has involved its assumption, could be expected significantly to augment whatever resistance there would anyway be to a re-acknowledgement of absolute motion. But some alternative interpretation of the red-shift is surely possible*: will be necessary, unless relativists can show that they are indeed properly so called. And if it is the case that they cannot be so, † then any sense of great loss as regards special relativity itself, at least, will be essentially an illusion.

Changes that would have to be made may or may not be thought self-evident. For one thing, the speed of light would have to be conceived of as absolute in itself (i.e. relative to whatever elusive 'medium-ness', *or restingness; the idea of some sort of which is surely inseparable from the idea of absolute motion) and thus variable relative to observers at various absolute speeds, despite measured invariance – to regard which as an illusion, rather than as a bizarre-and-fundamental fact of nature, has surely always been a valid option. The limiting real relative speed would then naturally be 2c (not, of course, that anything could approach any resting entity at faster than c). What is also surely a valid option is the 'naïve' inference by one from whom light rays are receding in opposite directions, that they are at 2c relative to each other. It is possible to imagine that that is the situation: whereas if one says that their relative speed must rather be c, according to the formula $u+v/(1+uv/c^2)$, one is implying that the value for c obtained by the observer in question is illusory (i.e., that though it is measured as c in each direction, it is really 0.5c), while relativists would also hold that the value c obtained in any reference frame is not illusory.

Still regarding what may or may not be illusory, there is the question of the dependence of apparent spatial separation of two entities upon the relative speed of their recession or approach. Davies (*ibid.*, p.44, italics his) says: '. . . this distance must *appear* to A to be only 0.9×4.84=4.36 light years, rather than 10 light years as measured by B. The spatial distance, therefore, has shrunk . . . '. First he stresses appearance as though to suggest that the shrinkage is an illusion, then he definitely implies that it is real. One may suspect that in this he is unconsciously taking advantage of the fact that the word observation is neutral in this respect. Or, since observation is regarded as the only means of direct access to physical reality, and all inertial frames are regarded as equivalent, the relativistic requirement here is that what may seem to be an illusion must nevertheless be real.

For such spatial variance to be real, however, space *per se* must consist in nothing but the separation of entities: may not be validly imagined as devoid of them, as would imply its absoluteness: must have an objective reality in its own right – which denial relativists may explicitly convey. One might ask how what is unreal can be really variable – which question, however, a relativist could simply reject, saying that what is variable in the sense conveyed is spatial separation, as distinct from the space-as-such to the idea of which it has given rise. But then the question arises of whether one can talk of real spatial separation without implying space as such. What can spatial mean, if there is no real space? – It can only be referring to an illusory feature of what is really a temporal separation only: so, if space as such is unreal, then so is spatial separation, as such, as termed. This might be compatible with mysticism, but clearly is incompatible with observational physics – for the purposes of which, then, one must regard space as having physical reality, being there, in its own right, and the apparent distance contraction as illusory (as distinct, one must expect, from length contraction of moving bodies*). It is true that per a disembodied visual consciousness in a space devoid of entities, the idea of space could not arise. In the light of the foregoing, though, one may say that spatial separation of entities betokens space *per se*. Acknowledging the reality of space, however, does not in itself help one in trying to imagine kinematic relation thereto.

"There seems no good reason for regarding this abandonment *(of the relativity postulate)* as incompatible with the experimental evidence to the prediction of which it leads"

And still on the question of medium-nature; if there is no such nature associated with space, or space-time, then light must be regarded as, in the words of George Gamow: 'vibrations taking place within the lumps of a certain physical entity (i.e., electromagnetic field) flying freely through the empty space.'[5] The writer has not discovered what response to expect if one asks a relativist how a physical entity can not only travel at c but also vibrate when $\sqrt{(1-v^2/c^2)}$ indicates zero frequency. To note that zero frequency would mean zero quantum energy would be no explanation. Perhaps it might involve an assertion that light has 'zero rest mass', and so is not subject to relativistic mass increase, and that this effect is of course linked to clock-slowing . . . again no explanation, even were it not evasive. Anyhow, this idea of zero rest mass derives from the idea that the rest mass of an entity corresponds entirely to the kinetic energy of its internal motions (as tends to imply an indefinite series of sub-particles), the zero value being associated with a total externalization of such motion. But if all the motion is externalized in the sense conveyed, the entity is left with no sub-entities: one may then ask how it can still be an entity–Bohm (*ibid.*, p.118) does say: 'light . . . does not possess any such inner movements' (though cf. Gamow quotation). But light does have associated energy, so one may ask: 'How can it not be an entity?' And: 'Since it travels, how can it not be a travelling entity?' The problem as such disappears, if one acknowledges that its wave-aspect cannot but imply some medium-nature. Clearly, no material entity travels when a wave travels: the only such (at any rate physical) entity involved being the medium. So light, *qua* entity may be regarded as a transient form of resting matter, continuously created and then decreated at successive points in, and from, whatever medium-aspect is the case.

The view that the idea of absolute motion is meaningless is bound up with the assumption (in relativists perhaps an unconscious wish) that there is no possibility of detecting it. Still, if its, at least implicit, assumption is essential to describing potentially real instances of clock-slowing without paradox, then the idea of it surely must be somehow meaningful in spite of undetectability (or the fault is in the mind)]. But is it undetectable? Clearly, if realized, Davies's experiment would itself afford indirect detection. Moreover, if the Earth and the star (or far more likely, a pair of relatively slow spacecraft) happened to have significant absolute speed in A's or the opposite absolute direction, then A's absolute speed would be greater or less than the observed relative speed (this itself different from the real relative speed, owing to the absolute effect on B): so that the journey would take either less or more ship time than the predicted 4.84 years. Regret as one may that the situation should be thus complicated, such results would surely demonstrate beyond reasonable doubt the reality of absolute motion, whether or not they were a basis for accurate indirect measurement. These aside, though; if it is true to say that Davies's experiment as described would afford evidence of an absolute difference between inertial reference frames, then (considering that acceleration is of only secondary relevance) so does all the existing evidence that has been seen as corroborating special relativity.

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*The writer uses this expression rather than just 'medium' on account of the likely necessity of some more subtle idea than that of an ether, as such.

*For instance, it could perhaps betoken a very gradually increasing charge-to-mass ratio of electrons.

†The writer has found nothing in other relativist expositions to discourage him from taking this view. (Apart from Bohm, e.g., Lewis Epstein: 'Danny has used some of his speed to carry him through space, and thus he fell behind Peter who used all of his speed for time travel.'[3] This need not be in context for one to see the implication of an absolute difference between reference frames.) He has found that Harald Nordenson has accused Einstein of unconsciously assuming classical time. Nordenson, though, rejects the $\sqrt{(1-v^2/c^2)}$ effects altogether; and his work is perhaps too abstruse, and extensive in presentation, to hold the full attention of most of those tending to assume that he must be wrong.[4]

*Davies notes that this should not be imagined as a forcible squashing, but as a property of space itself. However: if a body is shortening as it undergoes acceleration, the trailing edge must gain on the leading edge: since this is incompatible with the single acceleration rate implied by a single engine, one would seem justified in regarding it as effectively forcible. Moreover, given that the space in which the body moves is not in itself affected, the body's consisting of fundamental particles plus ill-defined interstices/bondings may mean that the effect on the body as a whole, unlike that on the particles themselves, will be less than according to $\sqrt{(1-v^2/c^2)}$.