Einstein - Some Annotations

Contents:

1. Outwards - Inwards, and the "centre" concept

From the aspect of the model presented on this web page it is rather confusing that Einstein in his books from 1916 or 1938 doesn't clearly differentiates between directions outwards and inwards.

Acceleration as gravitation and as the opposite, acceleration in a starting, lifting aeroplane is mentioned with almost no distinction. (It's said to be one of Einstein's fundamental experiences, the gravitational force he experienced in such an outward acceleration.)

Behind this lies the lack of a clear perception of the concept "Centre", a concept not mentioned either.

Yet, the whole idea behind Einstein's relativity theories and search for transformation rules between different co-ordinate systems implies the concept of different centres as origins in the co-ordinate systems. They are only implicit, not mentioned or really observed, Einstein already soaring around out in the three-dimensional space between the axes.

Concerning the directions outwards-inwards we have a similar case: He had the good idea of a "cosmological constant"* (A) for an expanding space of Universe, a repulsion mechanism, which means the opposite direction to gravitation, even if he later and wrongly abandoned it. (According to a rumour physicists rather recently have found evidence for such an expansion of Universe.) (Compare G/A-fields in the model here)

As it seems, Einstein didn't really recognise the kernel of his own intuition.

(And the centrifugal force was still seen as a fictitious force, only the effect of inertia of a mass, and still seems to be viewed as such.)

> (Einstein theorises about gravitation as if it comes into existence by acceleration - in an arbitrary direction - without reference to any centre. In comparison with the model here we could put a question mark after the expression "comes into existence". A force gives birth to an opposite force according to Newton, all right. But they could eventually be seen as born simultaneously, just revealing one another.)

2. Motions pre-existing as structure elements in higher dimensional degrees (d-degrees:

Einstein showed how Time, related motions, as a 4th dimension could be transferred to the same side of an equation as the 3 space dimensions and thus make up - or be viewed as - a 4th space dimension, a structure. He describes the 4-dimensional space-time as the "being", the 3rd-dimensional space with motions as the course (or process), the "becoming".

In another context in his books he also points out and illustrates the simple fact that the motion of a falling stone can be illustrated as a linear curve on a 2-dimensional surface with co-ordinate axes for time and position. Einstein says: "Now motion is expressed as something which ***is***". Once again, a structure element instead of a series of measure points as a picture of motion.

Here as elsewhere it seems as if he missed what the kernel in these views could imply. In the postulated assumptions of the 5-dimensional model presented on these pages we can say that this kernel is made a very essential part, with structures transformed into motions during steps towards lower dimensional degrees.

One reason why Einstein didn't developed these thoughts could be that he saw "motion as such" ("in sich") as a concept we cannot give any meaning. And one interpreter says: "It has always been self-obvious that motion as we interpret the concept must be perceived as relative motion".

But can we give any such concepts, as mass, charge, distances, particles etc., any meaning in themselves, without referring to other concepts, in their turn only possible to define in third terms…?

In these more general statements about motions and in the public's idea about "relativity" there is much vagueness.

Einstein himself took the fix velocity of light as a postulate and an absolute reality - and how to count on a velocity without something moving?

We can try to see motion as only a change in the relative position between two bodies (as a derivative of a distance), but if a jogger runs through the wood, which part will lose energy, the jogger or the earth? There is something with energy too in motions. Even if a uniform motion doesn't demand any force as Newton said, something put the body on the track.

With three objects changing their relative positions, it gets still more difficult. Imagine two persons separating walking in different directions, and we choose to regard them as the fix resting co-ordinate systems, the earth under their feet would be seen cracking, wouldn't it?!

There is more in Motions than the relative aspect. And it seems much easier to imagine the planets circulating around the sun than seeing the sun circulating around each individual planet.

3. The deflection of light around the sun: gravitation, curved space and/or influence of magnetic fields?

Einstein's prediction about this deflexion from a straight line proved to be true. Only

about a half of the deflection could be explained by Newton's theories, so one says, the other half depending on the curved space around the sun and Einstein's interpretation of gravity in the general relativity theory.

Some physicists at that time, who had difficulties with this theory, thought this deflection could depend on magnetic fields.

Without knowing anything more about their arguments, one can say that according to the model here there shouldn't necessary be any contradiction between these different views:

Firstly, we have the assumption that magnetic and electric fields, M/E, are developed out of G/A, gravitational and outward acceleration fields, as more complex combinations of the first complementary "poles". There is in that case a connection and relationship (as between father and son?) between what gravitation represents and the magnetic component of electromagnetic fields: a natural assumption in its most general formulation.

The physicists' disagreement could just be different aspects on the same thing, a question of analyses in different dimension degrees.

Secondly, we have in this model assumed the view that the propagation of light waves depends on the "negative" form of energy of vacant space. We have assumed that celestial bodies, as long as they are matter and not collapsed to merely a mass property and black holes, are depending on their "consumption" of that negative energy too. In their neighbourhood this "vacant space" could be less satisfying nourishment for light beams to keep to their straight course.

[Some physicists say the magnetic moment totally depends on the motions of electrons. Oscar Klein, commenting on Einstein's theory, says that the motion of the bodies should cause the gravitational force, like the magnetic one. We cannot agree with the formulation "caused by".

Here we see the two complementary forms of energy as with equal rights, and would sooner suggest to describe the same thing (if true) in another way: When the more noticeable bodies or particles move, the electrons for instance, the motion plus the body represents a deeper, higher d-degree from which the body and its complementary part were polarised (as E- and M-components). It connects the complementary poles and thus activates its counterpart. (?)

> The sun, one says, has a magnetic field divided in sectors of alternating polarity. Is it really possible to reduce such an example to only a relativistic effect of electrical charges?]

4. Can the curvature of space or space-time replace the gravitational force?

It has been said that Einstein did - and thus explained "gravitation". "There is no need for presumptions of gravitational forces…The gravitational equations of the general relativity theory are 'structure laws'" (*Foster*).

Firstly: It seems as if we have a false or unclear opposition between the concepts of "structure" and "forces". In the 5-dimensional model on this site here we have suggested to see each dimensional degree as a force in relation to higher or lower d-degree, and most elementary vector fields of d-degree 4 as binding "forces" in relation to mass.

Secondly: Why are big masses curving the space around them? How explain that without using the illustrations of gravitational heaviness of balls in 2-dimensional nets?

We could rather believe that centralised masses and empty space are complementary structures born simultaneously from polarisations into positive and negative curvature of structures… In compliance with this view and the model here Einstein denied the existence of an independent "absolute Room" (Newton's idea), which he found a "pre-scientific idea".

In reality, no physicists seem to have succeeded in dismissing the gravitation concept, still mentioned as a force in the standard model. (Remember too: the deflection of light around the sun was said to depend only to one half on curved space, to one half on Newton's laws for gravitation.)

For a body falling vertically from the sky towards earth, it must also be difficult to think it as depending only on a curved space.

Thirdly: In his general relativity theory, Einstein let such forces slip in through the backdoor with **the tensor concept** from mathematics, with the help of Gauss. Foster again: "While scalar and vector fields are sufficient to formulate Newton's theory of gravitation, tensor fields are an additional requirement for Einstein's theory". "An elastic body is placed under stress by body forces (such as gravity) acting throughout its extent and by forces applied externally to its surface". There we are again, with the gravity.

What Einstein studied was transformation rules for celestial bodies in relative acceleration to each other, that is in motion. This could be interpreted as studying the realities in a lower d-degree.

Tensor fields, what is it: neither scalar fields (as a density gradient) nor vector fields. They are also called "vector fields of a second order". One example is mentioned: when a material has different conductivity in different directions, presumably as alongside and right across.

Hence, without being mathematicians we could assume that these tensor fields introduces a more or less perpendicular relation between directions - the one we in our model here have presumed characterising d-degree 3.

(Compare perhaps the presumed Higgs' field, in some way "horizontal" versus "vertical" ?)

Rotation as a 2-dimensional motion is in our model attributed to d-degree 3, and rotation is a form of acceleration.

We could see this motion as a result or transformation of the binding force between the complementary "poles" Mass - Vacant Space.

We could put the question in this way: Which virtual motion as a built-in structural element in d-degree 4 is "precipitated" to motion in the d-degree step 4 → 3? It ought to be the vector character of direction inwards-outwards, which more or less gets lost in rotation (compare elliptical orbits).

The conclusion could be that the gravity which Einstein explored, could be the relation between these complementary poles Mass and Vacant space, not (primarily) the one between 2 celestial bodies, two masses which Newton was occupied with.

(This can have relevance for the question: How can forces act over distances? See further down.)

With Motion realised as acceleration we get a relation between Masses and Vacant space, between forces G and A, centripetal and centrifugal forces, as a relation of (more or less?) 90°. A curvature. The gravitational force is also said to be strongest along the

rotational axis, the centrifugal force along the equator plane. And the strength depends on velocity too.

So much about the d-degree step 4 → 3.

The reality of a centrifugal force?

Einstein wasn't ready to accept the reality of the centrifugal force, as he abandoned the thought of "the cosmological constant" (A) and "negative matter if it existed". Of the same reason, surely, he denied Magnetism the property of a force in its own right. He wanted to see electric and magnetic properties as only a relativistic appearance of the same thing, from different co-ordinate systems in relative motion. (In spite of the fact that the expanding energy of Vacant space now appears to be acknowledged, physicists still seem to keep to the same views on these "illusory" forces.)

> (One says that the magnetic field in the sun is divided in sectors with opposite polarities. It sounds hard to interpret this as only a relativistic effect between different co-ordinate systems in relative motion…?)

Have these things something to do with the opposition between **heavy mass and mass as inertia**? Renard writes: "At rotation the inertia moment plays exactly the same role as the ordinary (read "heavy") mass at translation".

Einstein showed in his relativity theory that the heavy mass and the mass as inertia must be of the same size. Is it just a question of analysis in different d-degrees - and the difficulty to detect the "negative" energies?

Einstein found the two kind of masses over and under a fraction line in his equations and thus possible to reduce away.

D-degree steps or complementary poles as inversions?

Two such examples:

Waves: A little wave, governed by surface tension, propagates with a velocity inversely proportional to the square root of its wave length, while a bigger wave, governed by gravitation, propagates with a velocity directly proportional to the square root of its wave length. (Thompson)

Celestial masses: The radius of white dwarfs is inversely proportional to the cubic root of their masses, while the radius of stars on the main series is directly proportional to the cubic root of their masses.

Matter as a combination of the opposite forces:

We surely have to see non-collapsed Matter as a combination of Space and Mass, of Acceleration and Gravitation. The A-factor built-in into matter inside stars. We have "radiation" keeping up the volume, we have stars expanding to big red giants, we have exploding stars… And the big difference between atoms with "emptiness" between electrons in the shells in particle models, and the atom structure collapsed to neutrons. Further, we have the disintegration force of weak interaction inside elementary particles. Probably all of this can be thought of as manifestations (in different d-degrees) of an elementary centrifugal force.

In the direction towards microcosm Space built into mass, in the direction towards macrocosm: Mass built into "Vacant Space".

So why don't accept the centrifugal force as a real force?

How to interpret the relation Mass - Mass, seemingly without complementarity: as of higher or lower order or d-degree? As some combination of two relations Mass -- Vacant Space, or what?

Between two M-fields we have attraction or repulsion, repulsion if similar poles, attraction between opposite ones. And the like between electrons with opposite spins in the atom shells.

Newton's gravity theory needed only scalar and vector fields. Vector fields are described as the derivative of scalar fields. We have in our model suggested Density (a scalar field) as first physical concept in d-degree step 5→4, in later steps polarised and appearing as Mass per Volume.

The polarisation principle seems to be active in the gigantic celestial clouds of stuff, so one says, with polarisations between hotter and colder areas, which contradicts the older views on terrestrial temperature diffusion.

Newton's binding force was a relation of 180° and only depending on Distance, a linear entity. The centrifugal force depends on velocity too, (This holds also for the relation E--M, between electric and magnetic fields.)

The attraction force between opposite charges are dependent on the charge value, which got Einstein to put this force in opposition to the gravitational one, only dependent on distance. But there is no opposition if we see mass and space as first complementary poles, in similarity with positive and negative charges.

One conclusion could be that Newton's gravitation between different celestial bodies is not a pure attractive one, or just part of the relation, and that we have to count on an opposite force at the same time, responsible for the partition of masses and the distances between them? (Cf. the planets not attracted into the sun, and the same for the arms of our spiral galaxy.)

5. Can forces act over distances or not?

Newton's gravitational theory seemed to imply that they could. Gravitation had an immediate effect from far off, without mediation. Einstein said no. He adopted from Maxwell's theories about electromagnetism the concept of fields, rather new at his time, (and saw an opposition between forces and fields).

He meant that the impact of gravitation between bodies had to propagate as light does, and with the same velocity. And physicists are still looking for the presumed mediating particle, the ***graviton***.

But doesn't the concept of "field lines" contradict this view? Which reality should then be attributed to these "lines"? And what about his own geodesists of the curved space, the more or less prescribed pathways as geometrical lines? How is it possible to deny an immediate effect over distances at the same time as adopting the concept "fields of forces"!

It seems as if there is a mix of two things in this general statement, mix of a static and a dynamic relation:
In our model here we have said: it's forces that create distances, as the acceleration force created Space during Big Bang.

Vector fields, chosen as the concept for the 4-dimensional phase, are not distinguished from forces. Such vector fields can simplified be seen as potentials with

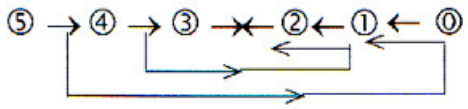
direction, "lines" of relations - and in a static configuration the relation line is there, **is** the immediate mediator.

Compare a railway: the real force is underground, the need for it, on a more abstract or invisible level. The quantifying of it in gathering different building material is a later substantiation.

And physicists still lack any god explanation for these gravitational effects over distances, so one says.

Another thing is if a change occurs in one end of the relation. This change may have to propagate along the connecting "line" or field as a kind of wave. Some modern physicists presume too that gravitons only "can be found" when big changes occur in celestial masses.

Yet, according to the 5-dimensional model here, there should be one d-degree of external motion debranched through -degree step 5 → 4 (that means polarisation and quantifying of a line) even in a 4-dimensional field, a linear motion:



How to solve these contradictory views?

According to our model such a linear motion should be an expression for the 5th d-degree and the relation between mass and the complementary pole, that is the "empty" space, not directly between two masses, as suggested above.

> (This could be one aspect on the fact which Galilei showed, that heavy and light bodies fall to the ground with the same acceleration speed - a fact that Einstein had big difficulty to explain in his book. The same is valid for the centrifugal force, not depending on the mass.
>
> Another general explanation of Galilei's experiments, according to our model, could be that vector fields such as gravitation and an outward acceleration force as of higher d-degree precedes the creation of masses, and for this reason are acting independently of such things as heaviness of these masses.)

So, if we accept that there is a motion (which takes time), representing a translation of the 5th dimension degree, in a gravitational vector field, we have still 4 d-degrees as structural vector elements, more abstract potentials, to be viewed as a reality preceding the motion and not having to "propagate", in themselves being "immediate effects" à la Newton.

We could have both, an immediate effect over distances, and something propagating, taking time?

And as suggested above: the attractive "line" of d-degree 1 could only be a part of the relation.

The linear motion moment assumed in 4th d-degree could perhaps be connected with **the fluctuations in density** in the negative energy of Vacant Space which Dirac (1960) mentions, and "an infinity" in these density variations which the mathematics of that

time didn't manage to handle. He meant it demanded a radical change in the physical theories of his time.

Density variations as 1-dimensional L-waves along "field lines"? Compare the suggestion in our model that the first physical quantity in d-degree step 5 →4 should be just Density, and that the outer poles defining d-degree 4 should be 0 and 00, zero and infinity.

Something has been said too in later days about fluctuations in gravitational fields on very small distances, 10^{-16} m (less than the diameter of protons).

> The very small fluctuations that have been detected in the background radiation of Universe concerns EM-waves, electromagnetic radiation. This is seen as a rest from Big Bang and a cause to the unequal distribution of mass in Universe. But couldn't it alternatively be interpreted as a secondary result of fluctuations in an underlying or more primary relation between G/A-fields?

A note:
About the velocity of the motional component:
In T-waves, as the electromagnetic waves, the energy has transversal ways of expression. In gravitational waves, presumed to be longitudinal L-waves, the energy has not. Couldn't that be a reason for these L-waves to travel much faster than light? (Oscar Klein said the propagation of gravitation with the velocity of light was a condition for Einstein's theory. Right or wrong?)

6. $E = - mc^2$; Einstein and the imaginary world - and about EPR:

It's rather curious that Einstein doesn't mention Dirac in his book from 1938 and Dirac's second solution to his own equation: $E = mc^2$, that is

$E = \mathbf{- mc^2}$, with the development of Dirac's hole theory, positrons as "holes" and such things...

It seems as if he didn't like a negative world or appreciated the "emptiness", in spite of this (relative) emptiness being a condition for his own moving around.

Nor seems he have liked the imaginary world of which so much indicates the existence. (Dirac 1958 about positrons: Each negative energy solution of the equation [$E = mc^2$] is the complex conjugate to a positive energy solution.)

Einstein introduced $\sqrt{-1}$ as a factor making time to a space dimension, purely mathematically.

But he dismissed or brushed off every thought of possible velocities higher than the velocity c of light, ***since*** it should give the Lorenz' transformations for the special relativity theory imaginary results. It would give negative lengths.

> (It's said that Einstein's presumption that no signals can propagate faster than light, is a condition for his relativity theory to be without contradictions.)

But what is a negative length?
It should be a distance in direction inwards the body.

Einstein's dislike of these things has probably connection with his disregard of the direction "inwards" - and centres - versus outwards, occupied as he was with outer relations between substantial bodies.

Negative lengths as inwards:

Compare negative distances with how 4-dimensional cubes has been illustrated, as cubic holes inside a substantial positive cube. This means negative surfaces and volumes too…

(We can imagine √-1 as the side of a negative square defined between the negative axes in a co-ordinate system. We can imagine this negative direction as inwards in relation to more fundamental mass centres.)

There are the many connections between negative values and imaginary (complex) ones as for Dirac's positrons and for example lg. x which has a pure imaginary term ip for negative values on x.)

Negative energies, velocities and (surely?) accelerations have been discovered in microcosm, and as imaginary or complex realities they must - reasonably - have been essential factors in the creation of properties as "Mass" and "Charge". (A simple picture for the principle could perhaps be a crashing car: its positive velocity being built-in into the car.)

> (There are speculations too among some physicists about backward directed time in connection with quantum phenomena. (As we could talk about backward directed time built-in into our memories!).

In biology we can identify a negative curvature inwards as a main principle of life (see later some extractions from the booklet Biology).

Inversions is one simple form of the direction inwards, from the outer side of the unit number one (1) to the inner side, in direction towards Zero (0). Inwards towards higher d-degrees too.

Hence, if we allow us to believe in an "imaginary" world representing more than a mathematical convention, and connected with inward direction, - imaginary expressions for not only time but potentials, surfaces and matter, negative values for acceleration and velocities - and inverted numbers, we shouldn't be prevented from imaging velocities higher than c.

> Perhaps we had such velocities during an eventual "inflationary" phase in the beginning of Universe (?), presumed by some physicists and astronomers. If so, what about the "gravitational answer" ?

About "pure mathematics": Einstein's formula $E = mc^2$ includes a factor c squared. And in his general relativity theory there is a formula for the energy loss through "gravitational radiation" with a term c^5 under the fraction line.
$dE/dt = [32\ G\ I2\ w^6] / \mathbf{5\ c^5}$. Surely only meant as a mere mathematical term, not intended to be interpreted as such an enormous velocity, but how if we did ?

In any case, Einstein shut himself out from such an imaginary world, as it seems. At least in his first theories.

The EPR-experiment:

Yet, in spite of his dislike for the imaginary world, Einstein was one of the contributors to the so-called EPR experiment in 1930th (E for Einstein): an only theoretical experiment (at his time at least) which concerned quantum mechanics.

Many such experiments have been verified later, according to *Penrose*.

If a pair of photons for example separates in different directions, both with left polarised spin, and direction of the spin of one of the photons is turned by an apparatus, the spin direction of the other photon changes mysteriously in the same way.

This shows on an immediate coupling between the two photons, which cannot be explained as transfer of information with the velocity of light. Thus it has been called a "supraluminal effect" and is not dependent on the distance.

Mutually seen, from a position between them, the separating photons have a complementary spin direction as far as I can understand, both before and after turning of the spin?

EPR effects are still not possible to explain with present quantum theory. (Nor is there any agreement among physicists so far on how to interpret such things as Heisenberg's uncertainty principle or the proper sense of Schrödinger's wave function.

Physicists don't talk about any "potentials" between the two photons in such examples as mentioned above and other similar experiments according to the references. "Potentials", however abstract, that we have suggested in our 5-dimensional chain. But if there was such a still undetectable, connecting "line" as effect between the two photons, could some kind of perpendicular wall crossing this line change the results?

We could instead suggest that the connection "occurs" or **is** there through the common source.

Compare in our model the difference between the outer connection between complementary poles as representing a dimension degree, and the inner connection through underlying higher d-degree as a kind of what is called "***superposition***" (should rather be "sub-position"), when a time factor still could be just a built-in structural element and not yet realised as a time-creating motion. This with a certain degree of support in Einstein's own view on motions as structural elements in illustrations of higher d-degrees.

7. The rotation of the elliptic orbit of Mercury:

One of Einstein's famous successes with the general gravitational theory was to explain this rotation of the elliptic orbit itself. Not only the planet rotates, so does the orbital too.

Couldn't we see this in a simple way as an example or illustration of the views in our model here that geometrical forms have more of a reality in themselves, and that planes as 2-dimensional structures from the outward point of view could be interpreted as preceding a linear, 1-dimensional pathway.

A 2-dimensional motion is debranched through d-degree step $4 \rightarrow 3$, when vector fields inwards/outwards (including gravitation) transforms to mass and space according to our model. But if the orbit is interpreted as a structure in itself, it should strictly speaking have a 3-dimensional motion according to this same model, which should imply a change in the angle of inclination too?

Some books, referred to above:

Einstein, Albert: *Relativity: the special and general theory. 1916*.
(Swedish edition, Göteborg 1997.)
Einstein, Albert: *The evolution of physics*.
(Swedish edition). 1st edition 1938.Stockholm 1965. (With Infeld, Leopold)
Einstein, Albert: *Field theories, old and new*. New York 1960.

Klein, Oskar: *Einstein's relativity theory in a general applicable form*.
(In Swedish), Stockholm 1933.
Dirac, P.A.M.: *The Principles of Quantum Mechanics*.
Oxford 1958. 1st edition 1930.
Foster, James: *A short course in general relativity*. New York 1995.
(With Nightingale, J.D.)
Renard, Krister: *The Foundation of Modern Physics.* (In Swedish). Lund 1995
Penrose, Roger: *Shadows of the Mind. A search for the missing science of consciousness*. Oxford 1994.
Thompson, D'Arcy: *On growth and form (Abridged ed.)*. Cambridge 1987

