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Three spaces.

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We are living tubes (worms), and through one of our openings (the mouth) the world flows in to flow out again through the other opening (the anus). This is why we can distinguish between 'forward' and 'backward'. Most of us are bilaterally symmetrical, and this is why we can distinguish between 'right' and 'left' (though some of us, like sea urchins, are too many-sided to do so). Originally we all crawled forward and backward, and left and right, on the beach of some pre-Cambrian Ocean, and thus there was no need for us to distinguish between 'upward' and 'downward'. Somewhat later some of us (like birds and insects) took off the ground, and some others (like cephalopods and humans) stood upright, though still sticking to the surface. For those who had taken off, a sphere of dimensions like 'up to the right' or 'down behind' open up, and for those who stood upright it was rather a hemisphere which became accessible to locomotion. This may be taken to be a description of vital space, of which all other kinds of space are either derivates or abstractions.

If you consider the hemisphere which is human space you will find that it looks more like a box than like a bowl, because it is shallow. We can measure the length and breadth of the space we cross in thousands of miles, but until quite recently the height of our space measured a few yards, and its depth a few inches. This wide and long but shallow box which is our vital space is better suited for geometry (measurement of the ground) than for topology (science of space), because it consists of two dimensions to which a third has been added. We upright worms think geometrically, equations of the third degree make us nervous, and we better leave topology to birds, bees and angels. If we devide our vital space ('Lebensraum'), we devide it into areas, and we never fight about cubic miles (even if we have an air force). Of course: we may extend that flat box of ours indefinitely by drawing a Cartesian cross, and it will then have three dimensions. Still: it will not have become 'real space', because it will still be a geometrical (not a topological) construct.

This flat box of ours stands still, and things move around within it. You might say that those things move with time, and that time blows through space like the wind through a room when the windows are open. Philosophers have thought deeply about time, and about how it relates to space, yet nobody will deny that time and space can be easily distinguished. Nobody will mistake a watch for a yard stick, unless he be crazy. Sometimes we do have a curious feeling about distances: is this place two miles away or two hours? But then you might also say that the distance between New York and Paris is a thousand dollars. But those are unnecessary idle reflections. The fact is that we live in a rigid space to be measured in miles, and that we move with a time to be measured in hours. Or at least: this has been the fact so far.

But we have the curious ability to put ourselves in the place of somebody else: we are capable of abstractions. We can for instance ask ourselves how space looks from the point of view of a galaxy (of which we know, of course, that it cannot look but can only be looked at). And if we ask such a question we find to our surprise that we cannot answer in words but only in numbers. The reason is that words are used to articulate vital space, while numbers are more abstract. (By the way: that is a very curious reason.) Now if we articulate how space looks like if seen by a galaxy, we will have to formulate equations of the fourth dimension. This is very uncomfortable, because even three dimensions like cubic miles make us nervous. But we now dispose of apparatus which may help us to perceive such equations. They are called 'plotters', and they can generate mythetic images out of numbers and show them on computer screens: we can see for ourselves what space looks like if galaxies look at it. We may call this 'outer' or 'cosmic space' and we may even build vehicles to explore those regions closest to where we are.

This is not good enough, however. We may calculate cosmic space, we may imagine those calculations on screens, and we may even send machines and people there, but ~~xxxlangxxx~~ we cannot really understand it as long as we cannot say what it is in the words of some human language. So we must make an effort to find some words to name some of those equations. This will result unfortunately in monsters like 'curved space-time'. And this ET-monster (which is more horrible than anything shown in science fiction movies) must somehow be incorporated into common speech, if we are to understand what 'cosmic space' means. The result may look more or less as follows:

Space is just as big as it is old, namely about fifteen billions of years old and fifteen billions of light years in diameter. It expands with time until time is exhausted, and this will happen when everything in space is evenly distributed. Because although space is empty, it is full of possibilities for things accidentally to happen and then be there for a time, and then disappear again. The things that happen there (like the galaxies at which we look, and like ourselves) are curves within the fields of the possibilities of space-time. For instande: the planet Earth is a curve within the field of gravitation of the Sun which again is a curve within the field of the gravitation of a galaxy, which again is a curve and so forth. You can calculate all this in algorithms, and you can show it on a computer screen, and now that you have uttered it in so many words you can understand it. Do you?

With this our capacity for abstraction is by no means exhausted. We may abstract ourselves from our vital space and put ourselves in the place of the particles which compose us. Here the problem is different. In the case of the galaxies we may ask: how would space look like if the galaxies could look at it? But in the case of the particles we must ask: what would space look like if there were any particles we ourselves could look at? Because we may look at galaxies, but if we look for particles like quarks we see only traces. We might ask: why bother? If we cannot even see those particles, why should we try to put ourselves

an their place? The answer is: we must do so, not only because of Tchernobyls and nuclear power, but because we are able to calculate it. Just like in the case of cosmic space we can formulate equations which say what that sort of space is. Now let this be put more carefully: since we cannot say exactly where a particle is, we should better say of that space not what or how it is but what and how it might be. This is why we should call it a 'virtual space', and only then try to understand it.

The equations which describe virtual space are even more exotic than are those which calculate cosmic space, because they calculate probabilities which is to say strictly nothing, (at least nothing yet). Probability calculus states what might be, but it says even more than that. It says that reality (that which is) and unreality (that which is not) are the two horizons of probability, and that the space of particles somehow oscillates between those two horizons. This is more or less what that monstrous word 'probability wave' means. But if you try to imagine space as such a sort of wave, you have not yet undestood what virtual space means. You must consider two other things as well: Anything you say about that space is more or less probable, and if it is either true or untrue, and is a meaningless nonsense. And second: there is another monstrous word, namely 'quantic jump', and it says that a partixle may jump from one orbit to another without spending time while jumping. The word says that a particle may be simultaneouly at two different places within that space. Do not try to imagine such a horror (you will not succeed), but ad it instead that what we are talking about is virtual time within virtual space, a not-yet-space with a not-yet-time, which is to say: we are talking about something where words fail.

Consider what has just been said about cosmic space and about virtual space, and then consider how people all around us talk about it. Every teen-ager talks about cosmic space, and every artist about virtual space, as if they and everybody else knew what those words mean. One thing is certain: those words mean something that does not fit into our vital space, that long and broad but flat box wherein we live for the simple reason that we are upright worms. You might say: all those people use those words because they are worms with brains attached to their mouth end. And a brain is a well-known parudox: it contains the cosmic space of which it is a part, because particles jump within the brain over nerve synapses, which means that the brain contains the virtual space which contains the cosmic space which contains the vital space in which the brain lives. But if you said so in order to explain why teen-agers and artists speak about the three spaces here discussed, you will have contributed to the confusion instead of simplifying the situation. A different sort of effort is needed, if we are to understand what is happening at present.

It is a fact that for more than a century now we are learning how to fly, and that, although we have not yet learned it properly, we already now can experiene space more or less like birds do. Another fact is that for some time now we have things that begin with the prefix 'tele-' which lerally may mean 'far' but which really means 'to bring nearer). Thus with the telescope we can bring things like the moon and the planets so near that they no longer look like being in the cosmic space, thanks to the telephone we can approach people which cannot be heard and seen in the vital space, thanks to the telegraph we can correspond with people over long distances as if they were in the same town in which we live, thanks to television we can see events as they happen in a quite different place within the vital space, and thanks to telematics we can become neighbors with everbody equipped with the same type of apparatus. Thus that long, wide and flat box we call our vital space is beginning to burst at it seams and its lid is coming off for us to get off and leave it. But there is another fact which may be even more decisive:

We no longer have a feeling that we can trust our vital space or the time that blows through it. We are now capable of simumating things so perfectly that we can no longer distinguish them well from the 'true things'. For instance we can no longer say for sure whether we are watching a real or a staged scene when looking at the TV screen, or whether that voice which speaks to us is human or the voice of an apparatus. On the other hand the fact that we can be telepresent instantly all over the place makes us doubt whether we are truly present here and now, or whether we are only dreaming. This means that we can no longer distinguish well between fact and fiction, between science and art, between the real and the unreal. Now this is a feeling which goes very well with virtual space, where true and untrue statements have literally no meaning.

If you take those two sets of facts together: on the one side the vital space is no longer closed but is opening up to cosmic space, and on the other hand it is becoming as untrustworthy as is virtual space, you begin to understand why all those people speak about cosmic and virtual spaces. They no longer feel at home within the vital space, and they are beginning to crawl out into othe spaces which somebody can calculate, and which everybody can contemplate on computer screens, but which nobody can understand in the true sense of that term. To put it differently: that upright worm which we are is beginning to take off, but nobody can say as yet where it is going, nor what it is plunging into. Nor even whether it is going to continue to be a worm, whether it is going to be crushed, or whether it is changing into a bird or an angel.