mechanisms for helping the proper evaluation and so preventing or eliminating semantic disturbances.

So we now have before us a unique object which we call by a unique name 'pencil$_1$'. If we enquire what science 1933 has to say about this object, we find that this object represents structurally an extremely complex, dynamic process. For our purpose, which is *intuitive*, it is of little importance whether we accept the object as made up of atoms and the atom as made up of whirling electrons., or whether we accept the newer quantum theory, as given in Part X, according to which the atom is formulated in terms of 'electrons' but the 'electron' is the region where some waves reinforce each other, instead of being a 'bit' of something. It is of no importance from our point of view whether the atoms are of a finite size or whether they extend indefinitely and are noticeable to us only in the regions of reinforcement of the waves. Naturally, this last hypothesis has a strong semantic appeal, since it would account, when worked out, for many other facts, such as 'fulness', in a *non-el* language; but probably it would necessitate a postulation of some sub-electronic structures.

What is important for our *s.r* is that we realize the fact that the gross macroscopic materials with which we are familiar are *not* simply what we see, feel., but consist of dynamic processes of some extremely fine structure; and that we realize further that our 'senses' are not adapted to register these processes without the help of extra-neural means and higher order abstractions.

Let us recall, in this connection, the familiar example of a rotary fan, which is made up of separate radial blades, but which, when rotating with a certain velocity, gives the impression of a *solid disk*. In this case the 'disk' is not 'reality', but a nervous integration, or abstraction from the rotating blades. We not only see the 'disk' (*b*) where there is no disk, but, if the blades rotate fast enough, we could not throw sand through them, as the sand would be too slow to get through before being struck by one of the blades.

FIG. 1a

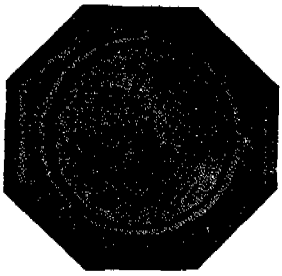

FIG. 1b

The 'disk' represents a *joint phenomenon* of the rotating blades (*a*) and of the abstracting power of our nervous system, which registers only the gross macroscopic aspects and slow velocities, but *not* the finer activities on subtler levels. We cannot blame 'the finite mind' for the failure to register the separate blades, because physical instruments may behave similarly. For instance, the illustrations (*a*) and (*b*) are photographs of a small fan which I use in lectures, and the photographic camera also missed the rotating blades and registered only a 'disk', in Fig. 1b.

Something roughly similar may be assumed for our purpose as going on in what we usually call 'materials'. These are composed of some dynamic, fine-grained processes, not unlike the 'rotating blades' of our example; and what we register is the 'disk', be it a table or a chair or ourselves.

For a similar reason, we may assume that we cannot put our finger through a table, as our finger is too thick and too slow, and that, for some materials, it takes X-rays to be agile enough to penetrate.

The above analogies are helpful for our purpose only, but are oversimplified and should not be taken as a scientific explanation.

This neural process seems to be very general, and in all our daily experiences the dynamic fine structures are lost to our rough 'senses'. We register 'disks', although investigation discovers not 'disks', but rotating 'blades'. Our gross macroscopic experience is only a nervous abstraction of some definite order.

As we need to speak about such problems, we must select the best language at our disposal. This ought to be *non-el* and, structurally, the closest to facts. Such a language has been built, and is to be found in the differential and four-dimensional language of space-time, and in the new quantum mechanics. In practice, it is simple to ascribe to every 'point of space' a date, but it takes some training to get this *s.r.* The language of space-time is *non-el.* To the new notion of a 'point' in 'space-time', such a 'point', always having a date associated with it and hence never identical with any other point, the name of 'point-event', or simply 'event', has been given.

How to pass from point-events to extended macroscopic events is a problem in mathematical 'logic'. Several quite satisfactory schemes have been given, into the details of which we do not need to enter here. As the *non-el* structure of the language of space-time appears different from the older *el* language of 'space' *and* 'time', quite obviously the old term 'matter', which belonged to the descriptive apparatus of 'space' *and* 'time', should be abandoned also, and the 'bits' of materials we dealt with