

Most discussions of the mind or brain focus on the "hardware",
the neural structure and its biological functioning.
But, it is the "software",
how the neural components logically interact,
that produces what we experience in our minds.

THE PROBLEM

SECTION 1

Introduction

THE PROBLEM OF INTELLIGENCE

The problem is to explain the phenomenon of human intelligence. Scientific knowledge has developed to the point where there is generally a sound understanding of most phenomena in the world, and for those phenomena not yet thoroughly understood there is confidence that development of the knowledge is only a matter of a little more time. But, for the phenomenon of human intelligence there is no well developed scientific explanation corresponding to that for evolution, physics, or biology.

The human brain and nervous system is a very complicated and sophisticated system. It not only performs the human functions of thought, intelligence, self-awareness, and so forth, but the lesser functions found in most animals such as purposive behavior and control of voluntary actions of the body. Furthermore, it is also an involuntary control system that monitors and controls all of the bodily functions so as to make the total biological system of the person (or animal) function in its best overall biological interest.

For example, the brain and nervous system control:

- fuel and materials input (food)
- oxidant input (breathing)
- processing and distribution of these (digestion, blood circulation, waste elimination)
- temperature control
- growth and repair
- reproduction.

Involved in these processes are systems of nervous and chemical (endocrine) signals and controls and semi- and fully-automatic sub-systems (heart beat, reflexes, etc.)

This system operates on an evolved design. Humans have sub-systems quite like those of lesser animals, These are apparently retained as evolutionary "carry-overs". They can also be viewed as the retaining of well-developed and well-proven systems of evolutionary precursors upon the basis of which, as sub-systems, the more sophisticated human systems are built. A partially true biological paradigm is that "ontogeny recapitulates phylogeny" or, in other words, that the development of the fetus from conception to birth recapitulates the evolution of the specie. An analogous, and related partially true paradigm is that the evolved human nervous system recapitulates and has as functioning sub-systems the evolutionary history of the earlier developed stages of nervous system.

Whether, if one were to design a human "from scratch", one would include all of these mechanisms is a hypothetical question to be perhaps answered in the future. Certainly most of the functions would appear to be needed. However, for the present purposes the issue is intelligence, explanation of that high order human function. Digestion is well understood by science and humans have no monopoly on the process. The same is true for reflexes, temperature control, and so forth. Consequently there is no attempt here to go into the detail of the brain's control of all those type activities of the human brain.

The objective is intelligence. How do we see, think, remember, know ourselves, learn, plan, create ?

In setting out to describe and explain these sophisticated functions, probably the most complex and sophisticated in the universe to our knowledge, it is necessary to start with simple first steps, building blocks, and gradually erect the total structure.

That procedure is followed in the next several sections. The reader is urged to be patient with the review of fundamentals in the earlier portion, which lays the basis for the development.

OVERVIEW

Until assigned a name, things are identified by their description. For example the letter "t" in the last word of the prior paragraph can be described fairly definitively as: roman letter "t", as in the last word of the prior paragraph, black, on a white background, Times New Roman font, size eleven point, lower case, non-italic. etc. Each of the components in that description can apply to a variety of other things, but together they specify the particular instance. A number of other things have some, but not all, of the *characteristics* of that "t" and have other characteristics that the "t" does not.

The specific individual momentary concepts in our heads are likewise describable in terms of a set of *characteristics* - ones that collectively are the particular concept of that instant, ones that are partially shared with a variety of different other concepts.

The process that goes on in our minds is a progression of such specific momentary concepts, *thoughts*. Successive thoughts are linked by having most of their *characteristics* in common but one or more different. A chain of such successive thoughts

is *thinking*. In the following analysis and development the *characteristics* are referred to as *universals*.

By the word “universal” is meant a class or category to which a particular specific example belongs. The universal is the common characteristic of all elements of a set. For example E-ness, moving-ness, shirt-ness in the following three examples of universals:

- All letters “E”, whether capital or lower case, hand written or mechanically produced, large or small, alone or among other symbols, etc.;
- any moving regardless of speed or direction;
- all shirts regardless of details.

This analysis involves the following definitions.

- Universal a class or category to which a particular specific case belongs.
- Perceiving properly correlating specific examples with their *universals*.
- Thought a set of a number of related *universals*.
- Thinking a succession of *thoughts*, i.e. a succession of sets each of a number of related *universals*, the *universals* of each successive *thought* differing slightly from its predecessor.

Our minds have thoughts by supporting representations of universals and by perceiving various universals amid a mass of other data. We think by chains of successive specific momentary sets of universals progressing from set to slightly different set in a systematic (logical, rational) fashion. But, ... how ?

From just above,

“Our minds have *thoughts* by supporting representations of *universals*”, and

“*perceiving* various *universals* amid a mass of other data”, and

“we think by chains of *thoughts*, i.e. successive specific momentary sets of universals”,

“*thinking* progressing from set to slightly different set in a systematic fashion.”

But, ... how ?

That is the subject of the following several sections.