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REPORT ON THE LAST YEARS OF ISOTYPE WORK

Isotype is the name of a visual language which Otto Neurath developed with his collaborators during the last 20 years of his life, and which we are now trying to develop further on the lines which we followed under his guidance. The name Isotype stands for *I*nternational *S*ystem *O*f *TY*pographic *P*icture *E*ducation; if we want to make two visual statements about the same thing, we use the same symbol again for this thing. Thus Isotype follows certain rather strict rules like a language; on the other hand it is less rigid and less complete, as it is an educational tool and does not attempt to replace words entirely. Every Isotype chart uses words too.

Otto Neurath has regarded the Isotype work as closely linked with the Unity of Science movement, as it endeavours to spread general knowledge in simple everyday life terms and aims at a wider acceptance of a scientific attitude.

Specialized terminology is a very great obstacle for the man in the street, and it has been the practice for some time to replace special terms by words of the everyday language. But this is a rather dangerous procedure, as very difficult and highly involved reasonings may thus be made to sound very simple, but often they sound only simple and are not really so. Pseudo-knowledge and pseudo-understanding can arise from such superficial "simplifications".

Isotype has always tried to start from the familiar and build up on it; it does this in all its charts and in the design of symbols. Many symbols are self-explanatory, many can easily be grasped and remembered when only explained once. I recently saw a map on which population and density were shown side by side as columns. This seems to me very inappropriate. You need nothing but a naive mind, it seems to me, to find the obvious solution. If man symbols or dots for population are put on the map, one gets a rough impression of

density straightaway. If the man symbols or dots are put on the unit of area, and if this is done for different countries, a more exact comparison of their densities becomes possible at once. So we see, that we don't need a new symbol to show density of population; we need only show that people live closer together, and we can do this by a combination of the simple symbols for population and for area. In the same way, using words, one could easily avoid "density" and talk of people living "more or less close together". Visualization, like the bringing of knowledge down to the level of day to day life, does not necessitate word for word translations, but a new and simple, even a naive approach.

When the work on Isotype started 25 years ago, the main aim and subject matter was teaching people about society; an object which seemed important in a young democracy. Many social relations are expressed in statistics, and so our main activity was to work out a consistent and effective method of visualizing statistics in a human way. Now the rules are so widely accepted and known that I think they need no further explanation.

As time went on, and more fields of knowledge were dealt with, the symbolism and the ways of visual representation developed, and with it the confidence grew that visualization is possible in any field of human knowledge, in so far as it can be put into scientific statements. The Visual "Thesaurus" has been an ideal to be aimed at, linked closely with the Encyclopedia of Unified Science. This comprehensive plan has influenced all the decisions we have taken when designing charts. Wherever possible we have tried to anticipate what future problems may arise, and to choose a symbol in a way which enables us to be consistent and to avoid future alterations.

On the other hand, it is impossible to anticipate all future solutions. The Isotype language has developed in the making of charts, and we have not first thought out a language and then used it. As a result we cannot predict what for instance the symbolism for types of "behaviour" or "character" will be before we have spent some time on the representation of the relationships in this field.

It has been the privilege of our Institute to have found the friendship and support of Lancelot Hogben, who, before having met us, saw MODERN MAN IN THE MAKING and gave it all support he could. Before we met him, his own books, MATHEMATICS FOR THE MILLION and SCIENCE FOR THE CITIZEN gave us the impression, that their author had a greater interest in visualization than most other writers. When Lancelot Hogben offered to co-operate with us as editor for a school book series, new fields of activity were opened to us. We started with

a "visual history" and are now continuing the work with a "visual science".

The visual history illustrates human activities and achievements throughout the ages which influenced the life of groups of people and the contacts between groups. How people get their food, build their settlements, make their clothes and tools; what the activities of town dwellers were; where writing developed and how it spread; how trade, discoveries, inventions in various fields made the world the one we live in. Personal names, heroes and villains, do not appear in this treatment – though nothing can be said against adding anecdotes, descriptions, reproductions of works of art, photographs, in order to illustrate the other side of history. The general statements we make are of this kind: there was barter over very long distances before there were people who made trade their occupation; herdsmen and hunters carried amber or shells for barter and so they also were traders. Only later when town civilizations with specialized productions came into existence, did trade become organized, as certain raw materials were needed. Unfortunately I cannot show the picture which tells this story pictorially. It looks like two simplified maps, with symbols for products and people, arrows for the way they travel, etc. All this remains in the field of everyday language: – horse symbols stand for horses, man symbols for men, etc. Symbols of the sort we had used in our pictorial statistics and organizational schemes could be used to tell these stories, partly in freer arrangement as sequences of little scenes: – for instance when we showed how fire was made and kept or big animals were hunted in early times.

In the visual science there may be scenes which at the first glance do not look so very different from the history charts; but when you look at them more closely, you find that some points of comparison are different and the statements that you read out of the comparison are of a different sort. A chart on the four seasons shows symbols of trees, animals, etc.; a chart on the life of the bees shows how the bees work for their food and shelter in a similar way to what we showed for human beings in the history books. It often seems very arbitrary, when one draws the dividing lines between the fields of knowledge – visually human knowledge looks unified.

The science charts also start from the familiar. The law of gravity is only a mystery on a theoretical level. The children have become used to things falling, and we can use this experience to make some general statements about falling things, and thus induce them to make more detailed observations without even mentioning the word gravity. They know see-saws well, and if we show boys on see-saws in various

arrangements, it puts their former and perhaps future experience into order. And if we show certain kinds of tools at the side of it, something which is similar in them, and some rules about levers may become obvious, without being fully explained in the orthodox way.

Floating in water, or feeling oneself lighter in water, are part of children's experience. We can go on to ask: which things sink, which are suspended, which float on top? And we can make a visual statement which makes use of a simplified balance to tell "lighter" and "heavier than water" and "of the same weight", at the side of a picture which shows the "heavier" at the bottom of a vessel filled with water (which, in Isotype, is shown as a section of a vessel with a wavy line texture inside), and the "lighter" sticking out of the surface of the water; the one of "equal weight" being somewhere in the middle. Such statements take less space visually then verbally, and certainly require less effort to be understood.

Later there is another chart which shows balloons floating about, above our heads. Nothing is there that supports them. Can this be so? Nothing visible. But there is air. And here we have to introduce a symbol or a texture for something that is invisible.

We have to show anything about which we want to make visual statements. There is for instance the story of water: ice — water — steam. We have designed symbols for these. We can even make the statement: steam is invisible. We made two pictures side by side, one symbolic, the other naturalistic: — we show in our symbolism stipples for steam, droplets for condensing part — which in fact looks like this: — a kettle with a cloud in some distance from the spout.

It is a fallacy to believe that only visual things lend themselves to visual representation. Of course, it is easier to understand the meaning of something that is recognizable, and symbols of trees, children, wheat, and sun, explain themselves. But other symbols may have to be introduced; some of these are traditional as lightning for something like electric current or voltage, heart for "love", cross for "death" (though only in the Christian world); but sometimes we have to make the decision to create a new symbol for which nobody has felt the need before, at least so far as we know. This happened when we tried to tell something about sound. As soon as we decided to design a general symbol for "sound" we could tell all the stories about sound we wanted: how it is produced, how it travels, what different sorts there are, etc. I think, these stories can be told better by pictures than by words, though of course I should never like to suggest that one should teach about sound only by pictures. Observations and experiments are the basis, the visual statements repeat and make aware

of what we have experienced.

We have also made a symbol for "heat". Statistical comparisons of calories produced by feeding with certain foodstuffs are often made and are also shown in symbols, and there is no reason why one should not also use such symbols to show something about how heat is produced, how it travels, and to compare conduction, convection, radiation, or to tell about specific and latent heat etc.

Any symbolism should be made so that it does not prejudice any theories which may be introduced later. A statement like "sound travels faster in metal than in air" – can be made without introducing any wave theory, but the wave can still be added later. We can show what we hear and, side by side with it, what kind of motion of air particles we can observe by suitable experiments. But the oscillation of an object and of air are not identical with the sound we hear, and if we want to link them in a visual statement, we need a representation of both.

In optics the problems are of a different kind. Light is all too visible. We cannot easily make red stand for yellow; we cannot easily use colour symbolically when we talk about colour. Isotype charts make visual statements and don't reproduce impressions. What can we do if we want to make scientific statements about impressions? Probably this is something which we would avoid to do visually, though it is not impossible.

Isotype is not a picture language in the way the Chinese script is. We do not say: what you can say in words, we can also say in pictures, What we say is: Don't say in words what you can say in pictures; and this we mean as a suggestion to a teacher. We suggest using a visual language to help easier understanding. We even suggest visual teaching not to be overdone, because of the danger of overcrowding visual memory. Most children are visually impressible, and teachers must feel the responsibility of what is to be impressed. Too many overlapping impressions may do more harm than good, especially if they are somehow contradictory or inconsistent. Isotype can't monopolize the visual environment of any person. But fortunately, most visual impressions are of the snapshot sort and don't interfere with Isotype statements. Others are so abstract and so different, that they can, I think, easily go side by side with Isotype without causing confusion, in the same way that different languages can be mastered by one brain.

In our first science books we had, somehow, to introduce chemistry and electricity. In the history books we had shown something about coal, how it had formed, when in the life story of the Earth

its formation had begun, etc. This chart, with small variations and shifting of stress, could be made into a chart about wood, coal, charcoal. We have made a chart: "air is needed for burning", "less air slows burning down", "more air makes burning stonger and quicker". We have now made another chart which modified this, and states, that this is not true for all sorts of air, and that there are different sorts. We had to introduce a symbolism which distinguishes between the different materials, for example we represent oxygen by a red dot texture, carbon by black shapes, carbondioxyde by red and black dots; an enlargement of the texture can tell how the arrangement of atoms is changed in the chemical process of burning. Rusting is another experience on which something about chemical changes can be said in a similar way. If a colour symbolism is used again which shows that iron has not disappeared but is still contained in the rust, then it becomes understandable that iron can be got back from rust, and iron production may then be explained as a sort of reversed rusting.

Children nowadays have many everyday experiences with electric current which provide us with a starting point for a series of charts, such experiences as the turning on of the switch, and the hot wire in an electric fire or bulb, and the electric bell. The diagrams we have drawn so far do not introduce a very unusual symbolism. The current is shown by red lines with an arrow texture and should still be recognizable on a black and white chart. Heat and sound effects can be shown with the Isotype symbols we had introduced earlier.

The first two volumes of Visual Science are being printed and will be available some time this year. I should like to get the comments and suggestions of many of your readers, and I am willing to send copies to those who wish to help in this way.

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