CHAPTER 7

FROM *VIENNA METHOD* TO *ISOTYPE*



GWM
GESELLSCHAFTS- UND
WIRTSCHAFTSMUSEUM IN WIEN

1. THE SOCIAL AND ECONOMIC MUSEUM IN VIENNA (1925) [Bibl. Nr. 156]

Aims

Nowadays all of us must understand social correlations. It is not enough to be able to read and write and to know something about arithmetic, science, literature and history: social changes have to be understood. However, the teaching in this field has hardly begun.

Modern man is conditioned by the cinema and a wealth of illustrations. He gets much of his knowledge during leisure hours in the most pleasing way through his eyes. If one wants to spread social knowledge, one should use means similar to modern advertisements.

Informative pictures and models should be part of a comprehensive whole, a course for everybody who wants to study social and economic questions without special preparation. Graphic representations of statistics should be made in such a way that they are not only correct but also fascinating.

The training of a suitable team for the preparation of useful pictures and models will take a long time. Not only have the methods to be developed and tested, but also sizes, colour, distribution in space will have to be adapted until a solution is found which satisfies; moreover, new changes will soon have to be made as the educational methods of the museum advance.

Experience has shown that it is much more difficult to prepare suitable representations for general information than it appears. It is not enough to notice and avoid mistakes which are so frequent in popular representations, it is also necessary to develop consistent rules and follow them successfully.

O. Neurath, *Empiricism and Sociology*
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2. Visual education and the social and economic museum in Vienna (1931) [Bibl. Nr. 199]

The Social and Economic Museum in Vienna was founded in 1924 by the Municipality of Vienna and the Viennese Chamber of Workers and Employees, together with leading social insurance institutions. It continued the work of a former Museum for Settlement and Town Planning which had started in 1923. As a centre for visual education it has a considerable influence in the world today, and its consistent 'Vienna Method' of pictorial statistics has been acclaimed as an epoch-making innovation in the field of visual education.

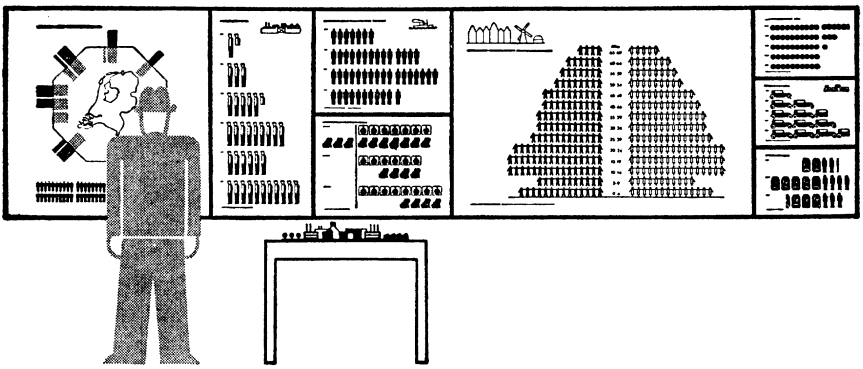
The basis of the method is that a greater number of things is always represented by a greater number of signs, and that a sign for a thing remains always the same. In this way a new sign language of great impact has developed – a Swedish newspaper spoke of a 'Renaissance of Hieroglyphics'. Whole series of simple stylised symbols have been designed which are required to characterize social facts: men, women, cogwheels,



vacuum cleaners, coffins, homes, ships, etc. Where possible known signs are used and colours retain their usual meaning. In short, all is done to give quick information which is easily remembered. Such simple, careful symbolic representation is educationally superior to expressionistic play with strong effective colours, to sentimental naturalism, and also to the jokes of caricature.

The Museum does not only make statistical charts; in its workshops, new projections and sections of maps are made, beside wooden models of buildings and parks, groundplans on transparent material in superimposed layers, magnetic charts on which signs can easily be re-grouped; also photographs are often used.

All charts and models are produced by a team; they serve the public and are not the expression of single individualities. The Museum has collected examples of graphic art of an informative character which, in style and content, are closely related to the Museum's work.



Even the furniture of the exhibition is to serve the Museum's purpose only and not to detract by sentimental or monumental effects. Size and position of a chart is such that it can be viewed comfortably. A four foot square became the basic unit. By sub-divisions and additions, a number of basic sizes of charts were found which can always be fitted together and also allow different proportions for single charts as required for different representations. The frames are narrow and of a light colour so that they do not detract from the charts themselves. Charts are held by specially designed wooden rails out of which they can be lifted for exchange. The exhibition stands themselves are composed of units which can form larger and smaller compartments. They are plain and of a light colour, the whole atmosphere like that of a club; the Museum's architect Josef Frank planned an arrangement and lighting in which the charts attract the main attention. They are all glazed, all lettering is of the same printed type; each variation that matters becomes the more noticeable.

Museums and exhibitions make a specially strong and varied impression. Visitors can study the objects at their own speed in the compartments. Groups can be taken round by a competent leader. Better than in a lantern slide lecture, pictures can be compared.

The main permanent exhibition of the Social and Economic Museum is in Vienna's New Town Hall in the centre of the city, and there are branches elsewhere. Material has been sent to many exhibitions at home and abroad, to museums and schools: social museums in Berlin, Zagreb and Klagenfurt, the Museum for Science and Industry in Chicago, to a

new technical school in Mannheim, to a peace exhibition at the Hague, to the social and economic congress of the International Industrial Relations Institute at Amsterdam, etc. The Museum has also produced travelling exhibitions which have gone to several German towns, to the London School of Economics, and to an international educational conference at Geneva.

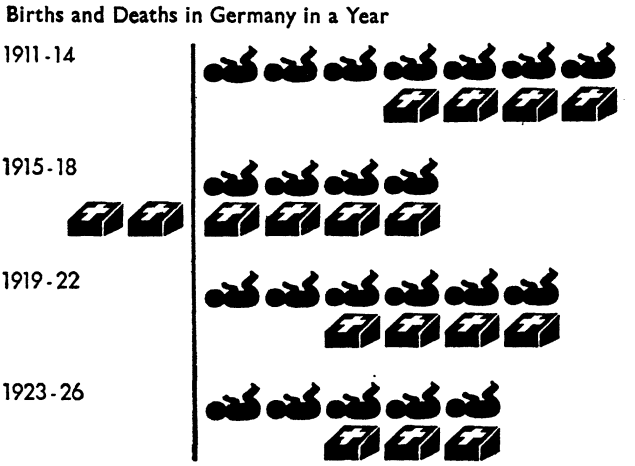
Besides its technical workshops the Museum has a scientific team and enlists the cooperation of experts in the field of statistics, map design, ethnology, history of art and technology, medicine, etc. Many data are collected and systematically coordinated. In this scientific department, the work for each chart and model begins, including a rough for the pictorial representation.

There is a permanent flow of production, and the collection of all kinds of visual education material is constantly growing: charts, lantern slides, blocks, models. Many prints of charts and single symbols are distributed to schools for their own work. There is a close and useful contact with Viennese schools and teachers; a special school in Vienna has been chosen for experiments in visual methods, in contact with our Museum. A school in Berlin has also started a special scheme in contact with us.

One day the method may play an important role in the teaching of illiterates. Just through its neutrality, and its independence of separate languages, visual education is superior to word education. *Words divide, pictures unite.* The work of the Museum will become important in all forms of international information.

The method of visual education has an important contribution to make to general education: to give fundamental, strictly scientific information for social understanding, even to the less educated, without depressing him in the way learned books and statistical tables do. Charts condense information without confusing. Visual education can even introduce illiterates to wide fields of knowledge and understanding without any previous preparation.

The Social and Economic Museum in Vienna is conscious of this international task and directs all its activities towards it in its exhibitions and its scientific and technical departments. Its stock of visual materials serves this purpose. It puts all its experience and material at the disposal of all those countries which send their numerous visitors to us.



3. Museums of the Future (1933) [Bibl. Nr. 213]

Supposing somebody came to me and said, "Build the museum of the future just as you want it." How would I answer him? "Agreed," I would say, "but that is not the way to put it. There is no such thing as the museum of the future. I can only talk about the museum*s* of the future." And I would go on: "Museums of the future, anyhow, ought not to be as I should like to have them, but as the visitors and users would want them if they knew what makes a museum."

To speak of the museum of the future is like speaking of the automobile of the future. Automobiles are manufactured in series and not produced one by one in a smithy. The idea that every museum ought to contain unique exhibits has come to us from the past. Famous individual objects are collected: a Madonna by Raphael, a calf with four heads, the armour of Charles the Bold, a stranded whale, the first locomotive, and other curiosities – especially those of which only a single specimen is to be had. And for many people the enjoyment of a museum visit consists in seeing something, no matter what, that they can see only once.

It was the same at one time with books: a famous manuscript entered into a collection, a unique treasure; but today, there are ten thousand

reproductions of the same manuscript. In the future, museums will be manufactured, exactly as books are today. This basic proposal to produce copies of museums in standard series has often been expounded, particularly by Paul Otlet of the Palais Mondial in Brussels. But the realisation of that idea implies international agreement on a specific method of representation. And thus we arrive at the second point, namely, that the museums of the future will have to be organized by agents of the museum users and not by specialists who want to exhibit what *they* consider important. Is that not just the sad part of most exhibitions, that every exhibitor has his own special purpose? He may, for example, only want to show how marvellous is the institution of which he is the administrator. So it may happen that in a public-health exposition, six different clinics demonstrate six times what a good sick-bed ought to look like. Would it not be a better plan if the clinics concerned were jointly to appoint someone to think out a way in which visitors to expositions could best be shown the principal innovations? Incidentally, perhaps, each of the six clinics might show in one common exhibit exactly what major novelty it has introduced – but six sick-beds, that is too much!

And why must the poor visitor to a museum of natural history look at hundreds of birds, even though he can perhaps hardly distinguish the differences, just because some particular ornithologist considers it necessary? Is it really so important to show in dozens of colourful panoramas how all sorts of rare animals live among the weeds and under water? What significant questions are answered by such exhibits? Would it not be far more important to tell the people whether there are many or few animals of this or that kind, which of them are edible, what the skin of this or the bones of that beast might be used for? Isn't it curious: we are constantly told that we are living in the age of technology, and yet when we enter a modern museum of natural history, there is no sign of it. Some of the minerals are shown, perhaps, in relation to their decorative uses; but we do not see the diamond as part of a glass-cutting instrument, or dust of rubies as a substance used for edge-tools, or agate used as neutral surface in a machine, or anything like this. A huge whale hangs in the middle of the hall; but we do not learn how the 'beard' is transformed into old-fashioned corsets, how the skin is transformed into shoes, or the fat into soap that finds its way to the dressing room of a beautiful woman. Nor do we learn how many whales are caught per annum, or how much whale-

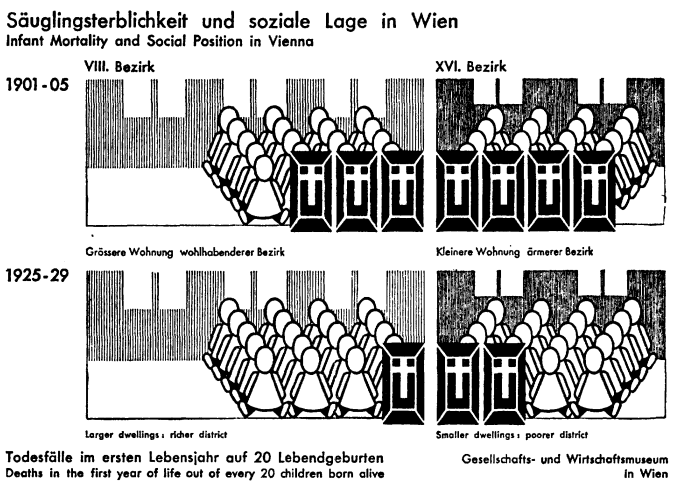
bone, fat and leather are produced by this means. And yet many people surely would be interested to know what countries are predominantly engaged in whaling. And some may want to know what this means for the balance of trade, how it relates to economic crises, and so on. Human fortunes are connected with this exhibit – starving seamen, hungry families of fishermen in the north of Norway. And so, everything leads to men and society.

How to organize human life socially – that is the great question which people are asking today with ever greater insistence. The social museum is the museum for our time. And this is its twofold task: to show social processes, and to bring all the facts of life into some recognisable relation with social processes. Take paintings, for example: they are parts of a social pattern and as such belong with homes and buildings, cities, costumes, and other works of human hands. Therefore, in the museums of the future, the marvellous works of the great masters will be shown within the frame of the social life of their time. Every event, every creative act, both influences the fortunes of humanity and is influenced by them.

But how is humanity to be represented in a museum? That was the question which the Social and Economic Museum of Vienna set itself to answer a decade ago. Since then, a group of collaborating scholars and artists have worked out a method that will be the foundation for the museums of the future. That method is known today all over the world and is being applied on a large scale. The way from Moscow to New York is long – even longer sociologically than geographically; and yet the same picture tables can be used and understood in both places.

What we need is a schematic representation that can be understood immediately. Of course, as in everything educational, success in this field is secured by giving up something else; in order to create pictures that can easily be remembered one has to omit many details. But that only proves the maxim that *he who knows best what to omit is the best teacher*, and he who can omit nothing from his demonstrations should not be a teacher at all. As might be imagined, the statisticians do not like to hear that. Since it is part of their job to count and measure everything as accurately as possible, they demand that everybody appreciate the trouble they have taken and remember the exact figures they provide. The Vienna school, on the other hand, postulates: *to remember simplified pictures is better than to forget accurate figures.*

So, out of the actual needs of the learners arose the Vienna method of visual education. The city of Vienna has a progressive municipal government; it has built sixty thousand tenements (to rent at two dollars a month for three rooms), hundreds of kindergartens, playgrounds, health centres, and many other things. But how, it may be asked, is it possible in any city with a democratic government to achieve so much of benefit to the masses unless the people understand what it is all about, at least in its larger outlines, and unless these enormous expenditures out of tax revenues are approved on the basis of a constant accounting to the people? Hence, general social education became a necessity for this city.



It is out of this need that the Social and Economic Museum of Vienna was born. When a Viennese citizen enters this museum, he finds reflected there his problems, his past, his future – himself. Take the matter of housing, for example: the aim is not to show what a particular building project looks like, but to help the citizen see the different types of homes that are included in the plan for the city's development, realize for what groups of the population these different types are intended, how they are going to modify the lives of people, to what extent they are going to help in improving health, reducing mortality – especially that of infants – and so on.

Only quantitative facts are socially significant; but most people are frightened by rows of figures, and diagrams they regard as an imposition. The pictorial statistics of the Vienna school represent larger and smaller quantities by larger and smaller numbers of symbols. So we see men and women, wage-earners and employers, automobiles and railroads, sheep and cattle, marching over the pages in simple, clear, coloured, contrasted symbols. One symbol means a given number.

The important point is that there must be a system of rules, a sort of grammar of picture language; that, and a dictionary of symbols. Perhaps the most original section of the Vienna central institution is the department of transformation. On it the educational purpose of the whole enterprise is concentrated. Every one of the scientific specialists must deal with the department of transformation, which in turn acts as a liaison between him and the technical departments. This has the great advantage that there is one special department which knows exactly what potential visual resources there are to solve any given problem of presentation. Besides, it is a decided disadvantage to have separate departments of a museum deal with their materials in different ways. Intentionally to aim at variety in this matter is wholly superfluous. The objects to be represented offer chances enough for variety even within a completely unified method of representation.

Just as in Vienna the department of transformation has succeeded in securing complete uniformity of method, so our effort should be to create a similarly uniform method for all the museums of a country – yes, of the whole world. Only through a unified, planned, central control of all museums and educational institutions it is possible to lead the public from one museum to another with the greatest benefit to its education, and thereby to make the individual more and more familiar with the world in which he lives. Museums, exhibitions and periodicals might be regarded as three different means of education with the identical purpose of making him less afraid of the world.

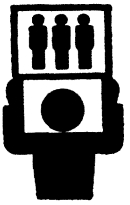
In the Soviet Union, the Council of People's Commissars has issued a special decree to the effect that "Dr. Neurath's method of graphic representation of statistics is to be applied in all schools, trade unions, public and cooperative organizations." For this purpose, a central institute for pictorial statistics, called Isostat, has been established in Moscow, where whole staffs are being trained for local bureaus, the first of which has just been opened in Kharkov. At present, five staff members of the Vienna

Museum serve as instructors and consultants in Moscow where, as specialists in pictorial statistics, they will also have the opportunity of introducing this new method into a social museum which is to be created.

The northern half of the world seems already won for the principle of pictorial representation of statistics. Now the movement will have to be extended also to the southern half, especially to those vast areas where illiteracy still prevails.

From Comenius' *Orbis Pictus* an uninterrupted movement leads to modern visual education. A picture made according to the Vienna method shows at the first glance the most important aspect of the subject; obvious differences must be at once distinguishable. At the second glance, it should be possible to see the more important details; and at the third glance, whatever details there may be. A picture that has still further information to give at the fourth and fifth glance is, from the point of view of the Vienna school, to be rejected as pedagogically unsuitable.

Thus a new clarity and purposefulness is developing in communication that may be regarded as preparation for more incisive social planning. Teachers and other groups of people concerned in social education, directors of museums, and editors of periodicals are confronted with the responsibility of placing their energies at the service of this common international task.



ISOTYPE

INTERNATIONAL SYSTEM OF TYPOGRAPHIC PICTURE EDUCATION

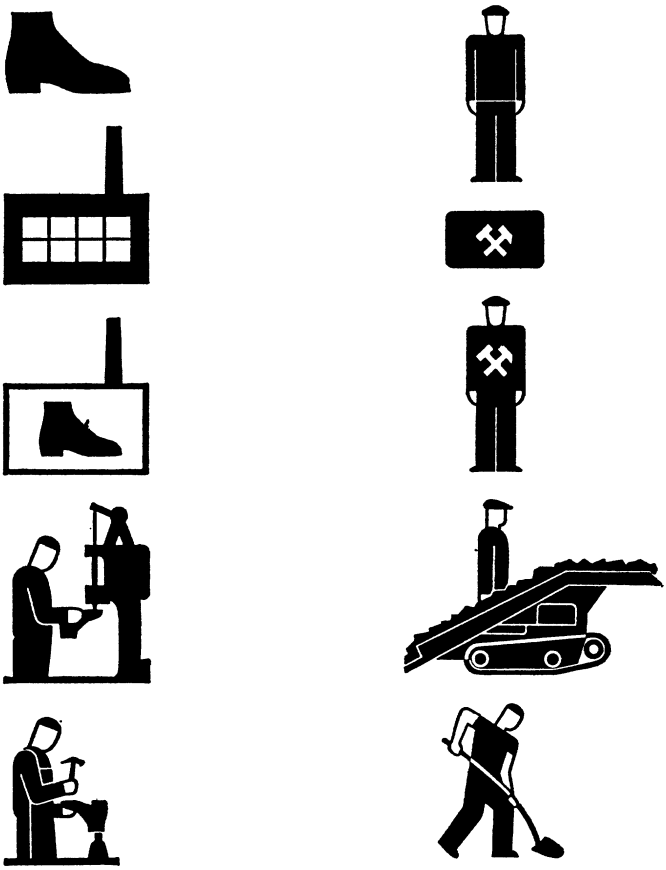
4. A NEW LANGUAGE (1937) [from 'Visual Education', Bibl. Nr. 235]

When will the Middle Ages be at an end? As soon as all men can participate in a common culture and the canyon between educated and uneducated people has disappeared. Life in that future day will be more fully lived and understood. Perhaps everyone will work as a specialist in his special field, but at the same time he will – he must – vividly take part in the common life, sharing understanding of and responsibility for the main problems of this world.

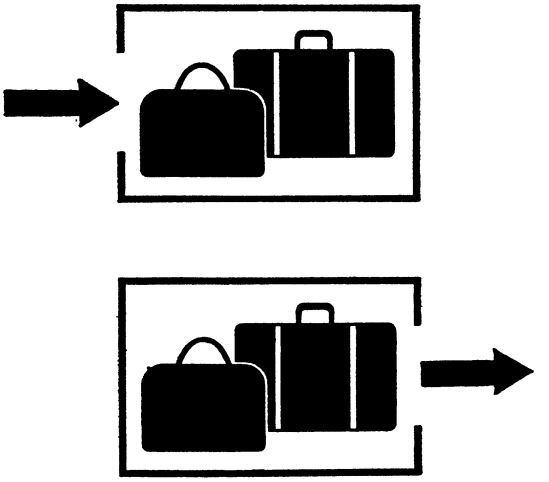
We have, in general, two groups of people in all countries: the one, very small, in close contact with the knowledge of modern times; and another and very large group which is scarcely touched by the great currents of our present civilization. Such a genius as Faraday could explain scientific matters even to children, as he did in the famous *Lectures on the Chemical History of a Candle*. But very few teachers and experts are able to open up the realm of modern science in relation to modern life, and to do so in everyday language. We need a new way to convey information, a method which is simple to teach and to learn, and at the same time comprehensive and exact.

One solution is Isotype, a method with a special visual dictionary and a special visual grammar; that is, a new visual world, comparable to our book and word world. The first step in Isotype is the development of easily understood and easily remembered symbols. The next step is to

combine these symbolic elements. For example there is a symbol for shoe and another for factory. By joining these two symbols to make a new one, we can talk about a factory in which shoes are made. By another combination, we can discuss shoes made by machinery and shoes made by hand. Similarly we can add the symbol for coal to the symbol for worker; and we can make an Isotype for mechanised mining and for pick mining. We can place symbols on a map to show geographical distribution, or range them in rows to express statistical relationships.



Where to put your boxes



Where to get your boxes

An international symbol-language would be a boon to the traveller in a foreign land. Even in his own country, symbols are better guides than words alone in giving traffic directions, and as signs in public office buildings, museums and parks. Symbols are adapted to the child mind, as they are to primitive minds. Yet the simple elements can be made to show the most complicated facts and relationships. The visual method, fully developed, becomes the basis for a common cultural life and a common cultural relationship. Visualization, rightly understood, is not only a supplement to other educational methods, but also a foundation for the more successful education for tomorrow in relation to important cultural and social movements of today.

When will the Middle Ages end? We do not know. We see war, the conflict of men against men, instead of a common fight against common danger, and the organized building of a better civilization. But we see new forces at work too, and new possibilities. To give them free play, we need more channels of communication and understanding. Here, I believe, the visual method is a significant development.

5. VISUAL EDUCATION: HUMANISATION VERSUS POPULARISATION[1]

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APPENDIX: How an educationalist looks at pictures]

[Excerpts from the manuscript, ed. by Marie Neurath]

I. *Tolerance in Education*

Education may be regarded as the transfer of certain traditions in a more or less systematized way, from one person to another person, from one group of persons to another group, particularly from one generation to the next. It is also the transfer of tradition from one nation to another.

The wide field of significant educational possibilities has hardly been discussed; there is much metaphysical speculation, and important parts of education are not yet touched by the analysis; only by chance have educational peculiarities been investigated as ethnological peculiarities. For instance a research worker (J. C. Flugel) has asked whether the whole examination procedure could be regarded as an initiation rite. This would explain why some sort of a certain torture is connected with it, also why examinations are not repeated – would it not seem sensible to have physicians re-examined from time to time? – and why they are connected with celebrations. Our educational system is not a well-built structure, a kind of railroad system, which has relatively few taboos and little ancient folklore.

If we recognize something as taboo and folklore in our tradition, we need not exclude it from education. It is frequently believed that acknowledging something as taboo implies fighting it, but this is a misunderstanding. I do not see why I should not transfer a taboo to the next generation when I

myself adapt to it by actions. Only I no longer call it an 'eternal value'.

It is possible to transfer tradition and say at the same time that there are other traditions not accepted by us; thus not giving our own tradition any absolute position. Accepting a custom does not imply any preference from a 'higher' point of view; avoiding certain actions or words may be nothing but just an example of 'this is not being done' within our community. Tolerance may be combined with strong traditional habits.

Within this transfer of tradition there may also appear a transfer of not always being dependent upon tradition; this is the element of democratic freedom. It implies that there are many parallel opinions, habits, patterns of conduct, which may be acknowledged institutionally as well as theoretically. For example, it is acknowledged that people may have different attitudes towards religion, art, science, etc.

Variety within a community has to be based on some structure of a society, and therefore we have to look at the social elements which make contacts possible between human beings from group to group throughout the world and a communication of understanding from nation to nation. A certain amount of trust is needed for successful cooperation, and also the possibility of making contact through language. If there is not one common language, then languages which are partly translatable into one another are wanted.

What we call Science may be regarded as the typical species of arguing which human beings of all nations, rich and poor, have in common. Discussions of sun, moon, stars, anatomy, geography, pleasure and pain may be carried out in any civilisation; theology and legal terms, on the other hand, are mainly local.

It is important to formulate what people have in common in a language which is as simple as possible, and as neutral as possible. A picture language, hieroglyphics, has the advantage of being independent of word language, is particularly suited to convey factual information in a simplified way, and has a certain neutrality.

Of course one can formulate verbal statements in a neutral way, but then they usually sound dull and unattractive. Visual education can be neutral without being dull.

II. *Why Humanisation?*

Knowledge has, through the ages, been handed on by the old to the young; old men can remember more precedents, and they also remember what their fathers and grandfathers told them. Therefore old men have great power in primitive societies, and this leads to their guarding secrets in order that their power may be increased. They initiate the younger men into certain secrets, but some secrets may be kept to themselves.

Education is the means by which all this secret knowledge is eliminated little by little. The modern tendency is to have none. Writing and printing are among the strong forces making for its destruction, since what has once been written now can be read by everyone. Young people are now in a position to be successful without the help of the old. Scientific information is within reach of everybody.

The term 'knowledge' is often ambiguous; I use it to indicate a more or less connected group of statements and arguments of a factual kind, synonymous with empirical knowledge. That transfer of knowledge, i.e., of certain statements and arguments, becomes more universal and comprehensive is a characteristic of modern times. Since everybody is implicated in taking common decisions, directly or indirectly, the spreading of knowledge seems to be essential for the smooth working of democracy.

In the oldest, very primitive society there was transmission of all kinds of knowledge. But with witchcraft rising, we get two realms: one of the secret initiated priests, and one of the illiterates. The position of the magician became more and more separated from the mass of the people. The ability to draw intelligible pictures degenerated and was not used for communicating knowledge to the masses. Writing became more and more the secret of the group of the initiated. Instead of communicating knowledge, the character of the writing became magical; the split between the literates and illiterates started in very early times.

Only where a whole people regarded themselves as the bearers of holy knowledge was there no illiteracy, as for instance in the Jewish community. The normal duties of their men included the reading of the holy text in the synagogue. In China the exceptional position of the literates, and in the Roman Catholic Church the Latin language, separated the literates

from the illiterates; a kind of Latin illiteracy was created even where people were literate in their own language. The same Latin language which supported international contacts made the contact between 'the two nations' within a country very difficult, creating a kind of gap. The evolution of national languages reduced this gap but endangered international scientific connections.

Today there is not only cooperation within communities but also international cooperation, and so education is hardly separable from organized humanity. The main bulk of adult education caters to people who are able to read and write without difficulty. But there are masses who do not reach this standard, not only in Europe but also in the backward regions of the world; there the education of illiterates is needed as the very basis of health education, agricultural education, education in citizenship. It is of enormous importance, of course, that people learn to use the language of scientific nations, at least as readers and listeners. But sometimes one is under pressure, and it would be important to speed up the process of arguing and acting accordingly.

One has to start with simple things, visual or other, but one should not forget that illiteracy does not imply stupidity. Many of the so-called primitive tribes have the ability to combine given ideas very quickly and cleverly; they also often avoid some of the speculative difficulties which are produced only by high-brows.

We must begin our explanations in accordance with the knowledge and vocabulary already familiar to the people. Gradually simple traditional expressions in more complicated combinations and perhaps some more advanced terms may be introduced. But in principle, one should try to build up more comprehensive knowledge by simply looking at the environment, and by using the language of daily life and its derivatives. This procedure from the simplest to the most complicated, I shall call *humanisation.*

Generally speaking, the average books destined for children and the man in the street start in a different way. They try to simplify the highest level of scientific formulation, presented in scientific books. Sometimes writers think that a translation of well selected terms into popular terms is sufficient, whereas it is common knowledge that the insufficiency of these terms was the main reason for the introduction of scientific terms. This kind of

translation from the complicated to the simple, from top to bottom, as it were, I shall call *popularisation* of knowledge.

In the humanisation of knowledge one tries to avoid what may be called an inferiority complex as well as all kinds of frustration which so often appear when people try to grasp a piece of knowledge in vain. Looking at a book often creates a kind of fear. There are not a few people who become uneasy when confronted with a general term like 'magnetism' but who would not be irritated by hearing about magnets and iron. Humanisation implies avoiding technical terms before they are really needed. The question is how far we can go without using more complicated expressions.

It is important not to tell children and adults that something complicated and highly scientific is going to be explained to them. On the contrary by using the pupil's apparatus for defining scientific terms we always should try to give him a feeling of relative sovereignty. All statements which speak of seeing, hearing, touching, tasting, etc., appeal to the average man, because every sensual statement is possible in the common neutral and democratic language.

Starting from the pupil's personal life, from his dreams and reflections, we may reach the wider world of scientific arguing. One day Einstein's relativity theory will be taught to everybody as simply as Kepler's theory is today. It seemed very strange and difficult to his contemporaries, but today it is demonstrated by means of oranges, knitting needles and candles. Of course, one cannot go into any details, but the intellectual environment of a period is composed not of scientific details, but of certain habits and attitudes. To try first to explain to a pupil what the Newtonian theory implies and then to show its shortcomings and how Einstein deals with them is a kind of popularisation. An average person who is not a Newtonian does not need to walk the historical way.

In starting with the humanisation of knowledge one should appeal to all sides of human life. Classical studies do this more than scientific studies do. Both fields have their defects as far as humanisation of knowledge is concerned. It is not so much the curriculum which hampers humanisation as the way in which the different subjects are presented. In the humanities

one learns to look at statements as something doubtful – whether some sentence may be translated in this or another way – whereas in science pupils become accustomed to a pattern of statements which seems to be unassailable and therefore only a fool would not accept them. In spite of the fact that in science arguing plays so great a part, the pupils do not become accustomed to argue on their own. Even the best intentioned teachers who start with their own observation-statements either have to select examples which are too simple, or have to spend days and even weeks with their students on some piece of quasi-research, in applying a form of trial and error method. Even if certain model researches could be undertaken, the mass of knowledge would be digested without permanent reflection or meditation. Whereas just in the humanities the ambiguity of the text, the many possibilities of translation, force the pupils, without particular effort on the part of the teacher, to be on the alert against the tricks and tracks of the language.

Education is not only the handing on of knowledge, it is also concerned with the ability to analyze observations and to find something out and to contemplate all the matters under discussion from all sides. Let us use the expression 'meditation'. Education advocates a meditative mood, avoiding noise and seeking quiet, but it is also a transfer of criticism.

Part of education deals with the evolution of one's own judgment, of a 'scientific attitude', a quality not restricted to scholars only; there are laymen who have it and scientists who do not. The transfer of the scientific attitude is not mainly concerned with knowledge but rather with the creation of certain habits, sincerity of research and integrity of arguing.

Classical studies make people acquainted with ways of life which are not theirs but are sufficiently similar to feel sympathy or antipathy with human behaviour as presented by history or literature. Anthropology acquaints people with wholly different ways of life; and that enables students to see the multiplicity of possibilities, but it does not enable them to imagine how these people feel, and hence judgment about human behaviour is more difficult. The Bible was a great source of education for the ordinary men because it gave them a picture of another civilisation very different from their own.

III. *Why Visual Education?*

Verbal humanisation is based on a language common to the classics and science, to literates and sub-literates. Whereas we have to make particular efforts to create such a verbal language, it is much simpler to create a visual language which satisfies a desire for communication. If something new is evolved it is easy to say what the principles are.

Visual education makes it simpler to remain in the field of factual arguing. There is a common base of visual material; one does not even get the feeling that there are two fields, science and non-science. Whereas traditional language is overloaded with positive or negative judgments, a visual language eliminates judgment. Simplified pictures can convey information without bias, perhaps because they have been so little used for this purpose. Pictures cannot teach subjects that depend on verbal expression only, as theological and philosophical doctrines. It is however perfectly possible to make quite complicated matters intelligible by pictures.

After the last world war, as again today [1945], there was a tendency to promote the publishing of history books which could be used in all countries. I doubt if it is possible to translate the democratic way of life into words which always have emotional associations; a person called 'murderer' in one country may be called 'executioner' in another. On the other hand, a symbol may be neutral and can be interpreted in different ways in different countries. Of course, a picture tells less, but in an attractive way. In writing it is necessary to give more detail and consequently more emotional associations. It is of course possible to try to use neutral words, but these are less vivid, whereas a symbolic chart is neutral and also attractive. Visual presentations of history and social structures can do without the often ambiguous expressions, such as 'democracy', 'freedom', 'tolerance'. Presenting a multiplicity of people with different religious denominations living together peacefully in the same country tells a story of tolerance more impressively than a written chapter on the same subject.

Visual education gives the onlooker the feeling that one appeals to him in an international language which may be understood in all countries. In visual education there is no clear split into science and the humanities,

nor into lower and higher levels. There are no gaps and therefore the learner has no sense of frustration, no inferiority complex. Visual education therefore is particularly well adapted to mixed groups in schools and to adult education. Literates and illiterates are more or less equal in the ability to grasp the main points of visual information and arguments. Authorities and people interested in the education of sub-literates should try to apply visual education in a consistent way.

Some people may see more in a picture of a building, of an animal, of a social structure than others, but nobody feels gaps, as one does in reading sentences with strange words or technical terms.

The application of argumentative charts supports a meditative atmosphere. People can seriously consider the pros and cons, a tutor can discuss the contents of charts in leisurely fashion, evolve argumentative chains and link them together. Sometimes he and his pupils may abandon such a network and try a different structure of argument from scratch. If such charts are printed on leaflets for each pupil to take home, he may continue his calm deliberation undisturbed by interference.

But sometimes the situation is different. For instance, a tutor may want to discuss some problems based on factual correlations which are not sufficiently known to a group of pupils. Then he may bring forward visual material which gives some information at a glance, and thus supplement some arguments.

Visual aids are essential for educational purposes in the widest sense; they are also useful where quick learning is needed, as in vocational schools. Here visual aids may be regarded not as substitute for verbal education but as an additional tool, used selectively and discretely.

In our civilisation we are adapted to perceiving and distinguishing many chapters in a book, but our visual memory has a narrower capacity. Some impressions may be strong but less exact, only relatively rough differences being perceived and remembered. Thus visual education is particularly well adapted to basic introductory work, leading on to finer diagrammatic activities or to formulas and tables. Our experience has shown us that people who become acquainted with well assembled visual material have felt themselves more interested in learning more details than they were before, and not, as some educationists feared, amply

satisfied with the basic information given. Visual aids open the doors into areas usually closed to less educated people.

The visual education approach has also proved successful with backward people. I remember how a teacher who took part in our discussion group on visual education told me that he presented one of our charts to children during a discussion of some simple correlations. A backward child who usually did not participate in discussions and hardly ever could give an answer to the teacher's questions, started shouting with excitement when the chart was discussed; here were symbols which could be recognized and counted; here at last he could grasp what the others were talking about. The child was manifestly impressed and happy. It is important to encourage rather than to depress pupils. Many of people's fancied inabilities to do things are due to the way in which they had been taught, which failed to encourage them.

In the case of visual education the learning person is more active than in listening to lectures; a selection of visual material can be regarded as a substitute for tutorial contacts; contemplating visual materials gives the onlooker's thoughts more freedom than simple reading with its fixed line of march.

It is particularly important to note that visual aids do not lead to only one statement in words, and that there are several different ways of handling the same visual material. The pupils have an opportunity to start with those elements of a picture which seem to be most impressive or understandable and then go on to evolve an argument. The result, on the whole, will be less precise than learning by heart. Visual material induces one to make fresh discoveries, therefore visual education may improve one's judgment, but it will hardly improve one's ability to satisfy an average examiner.

VI. *New Ways of Visual Education*

Frequent changes of the visual scene are characteristic of our modern urbanised life which is gradually invading the rural districts as well. Posters call to us from the walls; exhibitions invite us; the cinema screen attracts millions of people night after night [there was hardly any TV when this was written – M.N.]; an increasing number of periodicals and pamphlets present pictures in colour or black and white; teachers use visual devices in the classroom, addressing children and adults.

Visual education enters the curriculum of teachers' colleges and is beginning to be used from kindergarten to universities; in spite of all this visual education plays a small role in the books on education. The traditional pedagogical literature mainly deals with word-education. There is a gulf between the environment and the scientific analysis of education in our pedagogy.

It is remarkable that most of the illustrated books for children do not give the impression that the results of modern research into the behaviour of children and adults have been applied. There are many investigations which show that children and pre-literate peoples have no direct relation to perspective drawing; still, posters and other pictures for backward regions often use techniques of presentation which are either based on perspective realism or on certain highbrow peculiarities.

Children use drawings for telling stories, therefore they try to use the single elements of a drawing for statements. If one asks them why they give two eyes to a man in profile they will answer: he has two eyes. They draw what they know, what they want to tell. They are prepared to use symbolic drawings for telling their stories, and they are often inventive in this field. A child of six, asked to characterize a forest made a symbol of a tree and a toadstool, because a tree alone might indicate a park. This is in accordance with the traditions of all kinds of visual languages. Later on children abandon their symbolic habit and become more realistic in their drawings except when their education encourages symbolic representation systematically.

Children are usually more irritated by inconsistencies in illustrations than adults are who apparently do not take the illustrations of books seriously; we are not taught to look at concrete details. Children can explain details in their own drawings, and they usually notice inconsistencies in the drawings of others.

The suggestion to adapt visual material to the behavior of children does not imply an imitation of children's drawings, but an elaborate application of the main features of these drawings. Though it is fashionable to encourage children to draw, the stress is on the artistic qualities, and an average teacher is hardly qualified to judge them. The situation would be different if children were asked to convey some statements and arguments by means of drawings. Whether the drawings succeed in this can be tested

and judged by a well-trained teacher, whereas artistic qualities remain vague and undefined.

Today visual aids are presented, in films, filmstrips, charts, illustrations, because there are firms producing films, others producing filmstrips, publishers who want charts, etc., and not because we have sufficient analysis or even discussion of comparative merits of the types of visual aids.

There are not a few people who think that certain visual techniques are more progressive than others, that a colour film with a sound track is the last word in education, that lantern slides are old-fashioned and a poor substitute, not to mention illustrations and exhibitions which may be used as long as the film cannot conquer the world. I do not think that one can rank the different types of visual education in one row in order of merit; they serve different purposes; each of them has peculiarities which others have not or in a lesser degree.

Exhibitions and museums have their characteristics distinguishing them from book illustrations, lantern slides or films. Visitors, for example, can stand around an exhibit, look for longer or shorter times, compare one with another. A filmgoer is presented with a set sequence, a scene appears and goes by quickly, he cannot turn back the pages like leaves of a book. Museums are free for everybody, groups and individuals can go there, with or without a guide; their discussion could be supported by the visual material itself. Museums could play an important part in education. In fact they very often do not. Visitors are mostly overwhelmed and bored. Visits to museums are often 'ritual' visits. In museums, some people want to show something, directors, donors, etc.; these are more feudal than any other people in a democratic society.

Not a few people think that motion as offered in films is an advantage; I think that comparison is an essential element in education, especially in visual education, and that the lack of opportunity to make comparisons is detrimental. In films, you can neither compare two events nor the various steps in one and the same event. Should some one be interested in the paces of a horse or in the splash of a drop of water, a film of the normal speed does not tell him much; even a slow motion film is less telling than a sequence of twenty still pictures showing the stages of the horse's movements or of the splash side by side.

In a similar way much has to be said for planisphere maps as compared with globes. There are museums for science and industry which present the distribution of the world population on a globe which may revolve slowly. If we want to compare the population densities of the U.S.A. and India we have to wait until the globe has turned and to remember what we have seen before. What an advantage is an equal-area flat map which shows us all countries side by side. On other occasions three-dimensional presentation may be preferable.

As often as possible visual material should be comparative not only for instructional purposes but also to accustom the student to the making of comparison himself. Even a picture of an unfamiliar animal should sometimes be accompanied by a picture of a well-known one to point out the difference in its details. Often it is difficult to use snapshot material to educational advantage; every snapshot contains details of which the photographer was unaware and which may lead the onlooker's attention astray. A snapshot uses a given viewpoint – sometimes two viewpoints might be better. Perspective drawings too stress this incidental element of a viewpoint, which is an educational element. Education will improve when we are prepared to use any kind of variation.

To make comparative studies in education we have to look at educational arrangements for months or even years. The difficulty is that the whole personality is involved; we do not know which elements may be of importance and what kinds of variations should be tested. In the case of visual education an assessment is particularly difficult because we do not know much about the possibilities in question. Presumably it is not only the contrast between film and static material which counts, but also the contrast between the pure 'snapshot type' and the schematic type.

One element of education is the teaching of how to argue. This means the child must learn how to treat the pattern composed of colours, shapes, sounds, smells, feeling tones and learn to distinguish between what are usually called the essentials and what the incidentals. The pupils should become accustomed consciously to making a proper selection – proper from the point of view of a certain argument which is going on. In an experiment, the shades and highlights on the vessels and the table may be regarded as incidentals only, what should be noticed is that one fluid boils and evaporates more quickly than another.

A 'visual argument' is a combination of verbal and visual aids leading to the essentials. The visual aids, to be educational. have to contain networks of visual statements and arguments, they are language pictures. The technique which we have called Isotype (International System of TYpographical Picture Education) has been developed to create narrative visual material, avoiding details which do not improve the narrative character, and to present easily distinguishable language pictures. To present the essential elements in visual style, each argument has to be reduced to its bones. This reduction seems also to be important in words. Continuing a visual argument verbally, obviously leads to a verbal style which presents similar features. I was very conscious of this when I had to broadcast on our work without pictures.

Let us now have another look at the various types of visual aids in an integrated approach to visual education.

The analysis of snapshot material – photographs, films, models, stuffed or living animals, engines – starts with focusing the attention on perhaps hardly distinguishable but important details. Looking at an Isotype chart or any carefully made biological, technological or strategic drawing implies that one tries to find out the distinct elements of such a language picture, and then to read it in some way or other. At least two types of activity are characterized in this way, both of them well known to people with a scientific habit. Realistic material suggests the creation of more and more observation statements with all their multiplicity, full of whimsicalities which may be regarded as unimportant today but important tomorrow. From these observation statements the scientist reaches the statements used in his theories based on and correlated with observation statements but distinguishable from them. Isotype aids are comparable with scientifically formulated statements. Schematic and symbolic aids therefore form an essential element of visual education and one should try to present them in sufficient quantities in school and adult education.

Adult education could use local museums if they could be reorganized, arranged and selected according to a plan, and drawings and photographs could be added to fill gaps. There is not much humanisation in the museums of today, no real tendency towards information, there are no 'trustees of the visitors'.

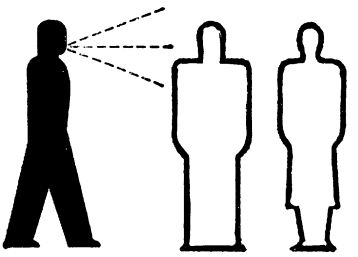
For instance, if we want to have a museum on classical times, we should try to give the population, area, rivers, etc. Then the strata of the social

groups in rough numerical proportions, the careers of famous men, of average citizens, of slaves; then going over to the realistic material, we should try to present a model of a city with private houses, palaces and temples; then we should try to analyze the private houses, as far as possible, by means of reconstruction or guesses, possibly presenting different guesses. We should not present the material simply as we have it in our stores. We should even include music, noise, smell in our general scheme; even if we think that such a plan could hardly be realized, thinking of it will help to make us aware of the defects of our work. We should also give an indication of temperature and of the climatic environment by means of charts and maps, when presenting buildings and dresses.

From an educational point of view we should try to avoid watertight compartments such as Natural History Museum, Arts Museum, etc. An exhibition on whaling, for instance, may present a whale (a body section in addition to the rather boring outside) together with all the things which can be made of the whale's body, scent, stays, boots, oil; margarine production can be compared with fats from other animals and plants and can lead to charts on the fat economy of the world, commerce and trade etc., and to the subjects of technical peculiarities of tank ships, whaling, the life on whaling ships, the career of whalers, co-operative societies and trade unions; also to life and love of whales, where they live and move about, the biology of whales, other sea mammals; whales and whaling in history, religion and tales, big fishes and other sea or water animals, fetishes, taboos, etc.

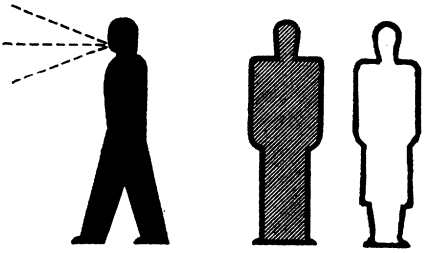
In health education one can start in various ways, from the personal life of the visitor or from comprehensive views on mankind and its history. Usually one started exhibitions on tuberculosis with pictures of healthy and sick lungs. We did so ourselves many years ago. But we found this is a scientist's start – why should the man in the street look at these lungs as something of importance? We decided to start with a simplified story: a stranger enters a family, infects the husband, the husband his wife; the family is growing, some children get tuberculosis, one remains entirely healthy – that teaches the lesson: tuberculosis is infectious, not hereditary. Now the question arises: how to prevent and fight tuberculosis. Treatment and healing were explained, and only at this stage details about the lung were introduced.

Every Case of Tuberculosis Comes From Another Case



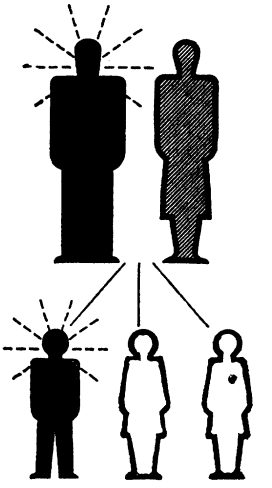
A relative or boarder who has tuberculosis comes to live in the household of this healthy man and wife. One or both are likely to get the disease from him.

One year later.



The boarder leaves the household. The husband has been infected. He shows no signs of sickness.

Ten years later.



Tuberculosis has spread in the family. The husband is sick with tuberculosis. The wife is infected but not sick. The oldest child also has tuberculosis. The second child is in perfect health. The youngest (with black spot) shows an infection which has healed.

VII. *Picture Language*

The multifold and colourful visual environment asks for some co-ordination, otherwise a bewildering and disturbing visual chaos may develop. It is important that onlookers should become accustomed to conventions of visual presentation; we should try to use visual elements like the elements of a language and treat pictures as 'language pictures' which are connected with one another. The unity of language is particularly needed where a schematic presentation is in question.

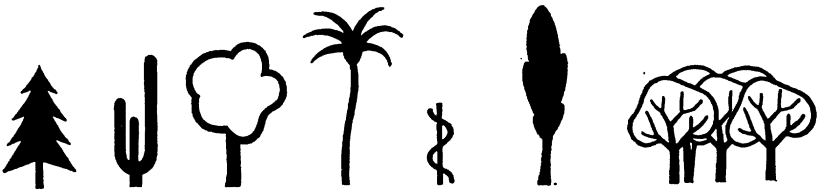
Sometimes language pictures are closely connected with picture language as for instance in Egyptian wall paintings or reliefs where, besides the hieroglyphic writing, the arrangement of the picture itself tells its story in a pictorial way which is more or less fixed by traditional rules. The individual masters of these wall paintings do not intend to change the rules but try to be creative within the framework of the rules. All of them use the same visual language. For instance, a writer counting the number of cattle of a landowner is presented sitting down with his writing tablet on his knees, and the cattle before him are arranged in easily countable groups. Such a language picture can sometimes be regarded as being based on a certain picture language. The traditional picture languages need a richness of variable elements which carries them far beyond the purely pictorial start. In the later stages the characters hardly resemble the primary pictures and therefore the direct visual approach vanishes. The difference between deformed picture writing, for instance Chinese writing, and our alphabetical writing is rather unimportant from the point of view of visual education.

There are different traditions of visual symbolism in the field of anatomy, biology, technology, geography and tactics; we may try to fit them together into one pattern of symbols, the same symbols to be used in all fields, Isotype.

The 'writing' of such a visual language as Isotype is based on a rich vocabulary of some thousands of symbols, which can be used to represent wheat, sugar, iron production, healthy and infected lungs, population, carbon and nitrogen cycles revolving through living beings, air and soil, births and deaths, vegetation and soil, etc. Such symbols may be combined in various ways, and one can go over from one field of arguing

to different ones without altering the language. Of course traditional visual material is also based on visual languages, but the conventions change from author to author, from book to book, and often even within the same book or the same exhibition. That is tiring for the 'victims' who have to waste much energy overcoming the alteration of the language. It is annoying when in an exhibition the same coloured lines are used for railroads on one chart and for the streets in the next, when two parallel lines stand for 'wall' in one and for 'tube' in another chart. But as long as teachers have to use the traditional visual material they have to explain to their pupils that they deal with various visual languages.

For visual education it is important to think of qualities which are not merely common to all but also characteristic of all. A symbol cannot give all qualities; there will have to be *pars pro toto* and specimen for species.



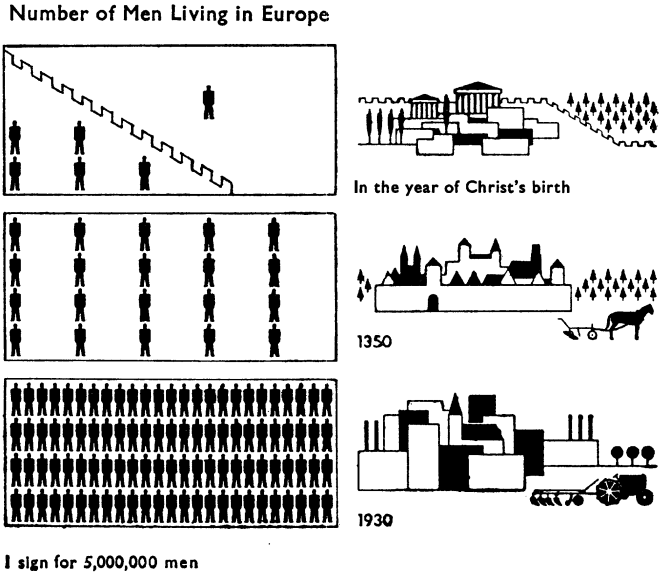
One cannot make a self-explanatory symbol for 'tree' without selecting a certain type of tree. Therefore the more general an expression, the less self-explanatory the symbol is. Thus in visual education one cannot make statements as general as in verbal language.

Colour plays a special part in the visual language. Of course there are not as many colours at our disposal as there are subjects we want to indicate; if we use too many shades of colour they will partly not be noticed and certainly not be remembered. If visual representation is to be impressive, multiplicity has to be reduced. Where we refuse to use too many colours, as e.g., for elements in diagrams which explain chemical processes (carbon black, hydrogen blue, oxygen red, nitrogen green, etc.), we have to use letters of the alphabet in addition.

Colour symbolism in Isotype is adapted to popular usage. Green stands for agricultural, but we use green also for 'primitive' and for 'youth'; red is used for industrial, modern, as opposed to agricultural, primitive. For

the stages in between blue is used, for instance for Middle Ages. For population groups of the world we have used white, black, red, yellow, brown; but if one wants to avoid the over-stressing of the colour of the skin, one could, instead, use only such colours as green and blue which never are colours of skin.

All graphic techniques have a limited exactness, whereas calculations in figures can be made as exact as we want. Statistical Isotype charts need a kind of scale like that of a geographical map: on a map one inch may represent a mile, while in a statistical Isotype chart one car symbol may represent a million cars. We can show the geographical distribution of cars, of human beings, of plants etc., on maps, but of course all these symbols have to be of a certain size and the localization cannot be very exact. A dot map is much more exact, but dots can stand for anything and the symbols are self-explanatory. Whereas such expressions as 'average density of population' sound highbrow and dull, the visual presentation may attract the eye immediately, and it is easily understood. A story of production or population may be as stimulating as any other story if told in self-explanatory Isotype symbols.



To master the art of writing in Isotype implies not only that conventions are used concerning the symbols and signs and colours, but also that certain rules are applied to make certain parts of a visual arrangement so conspicuous that the onlooker feels himself guided to a visual argument. Spatial emphasis and colour play their part. The onlooker need not become conscious of such rules. The making of visual aids is a particular business, just as map making is a particular business. It is hardly possible for a teacher to prepare a sufficient number of visual aids with care. The amateurish character disturbs the pupils and the preparation of such aids creates a burden for the teacher who cannot devote the necessary time and energy to this task. So we should separate the preparation of educational materials from the use of them, just as we separate map making from map using. If a highly skilled staff of scientists, experts in visual education, and specialized draughtsmen can collaborate, the joined skills should achieve a very high level of educational vividness, making visual aids as attractive as they are informative.

What the teaching profession needs is a great variety of visual aids which provides alternatives in many cases. There is no advantage in having more than one visual language; change in language does not increase the richness of the visual store; standardisation of symbols and language rules does not imply standardisation of statements made. Isotype experience teaches us that consistency of visual education is possible, that the same technique of visualisation can be used on all levels, to support scientific arguing from the start, and in all departments of scientific arguing.

Well elaborated visual aids make it possible to organize teaching so that any teacher can teach successfully; though it may not help the best teachers to improve their results, it prevents the worst teacher from doing any harm. If it is not applied too pedantically the slogan might be promoted *what you can present by means of pictures, do not tell by means of words*. Very often it is preferable to remember rough pictures than to forget exact data.

But we should bear in mind that visualisation has limitations, and we should be careful not to overrate the importance of visual education. The visual field is so limited that when people seriously want to explain something in detail, they usually resort to the verbal field. The tendency to be found in Isotype is not to intrude into the verbal field by building up a

sort of international writing for which a great number of non-self-explanatory symbols would be needed; the tendency is, on the contrary, to remain self-explanatory as long as possible, to create narrative pictures composed of self-explanatory symbols, aided by words, and as an aid to words.

VIII. *Visual Education and the Future*

Visual education leads to internationalisation much more than word education does. One can use the same visual arguments, connected with different words for explanation in various languages; one can even vary the remarks on the same visual material. Visual education is related to the extension of intellectual democracy within single communities and within mankind, it is an element of international social planning and engineering.

This is a period of planning, planning for getting something done, where without planning defects are manifest, such as destruction of coffee, unemployment, etc. But we can remove all this without regional planning, without city planning; we can imagine a nation with planned production as far as raw materials are concerned, but also building up 'planning for freedom', which signifies intentionally *not* interfering. Much city planning is full of pomposity, with a totalitarian undercurrent, pressing forward some way of life. Perhaps people want to do so; but the dictatorship of planning is a danger in itself and is not connected with planning against want. You may be in security, but free to choose your kind of life within this security. The either-or is important. We may create certain conventions in language without unifying the laws; a world language does not imply a world dictatorship but may help world understanding. For a democratic society it is important to have a common language.

The organisation of cooperation in communities is an essential element in the history of mankind. In small communities it is based on more or less fixed customs and language. Tribes which meet for barter cooperate by finger language and do so for certain purposes only. If one has bigger realms, the communication of knowledge plays a certain role, though in some societies it is confined to determinate groups. Within a democratic cooperation, everyone wants to connect his own decisions with someone else's via a central organization. It is not so important to establish the

contact from neighbour to neighbour, but to non-neighbour. In this connection it is important to create a common atmosphere for people with different language, different occupation, different outlook who are in the same society.

One should not overrate the importance of a common language for human brotherhood. Sometimes the most aggressive enemies use the same language. They may be living in different territories or in the same. Civil wars are more merciless than other wars in spite of the fact that the parties understand each other better than two parties who have no common language. Moreover, we have well organized states with more than one language, e.g., Switzerland with its four languages.

Besides being more international, visual education from the beginning enforces a more human approach than education through words. It can only deal with things which are within the grasp of everyone's understanding. Because of this, too, it is international. We may present a lot of visual arguments, not in any way offending the various religious creeds, the various kinds of philosophies or other formulated or not formulated ways of life found on earth. (There are certain taboos that reduce the area of presentation, as e.g. the sex taboo. We have to think of visual arguments not offending taboos.)

It would be childish to think of educational means as something isolated from social organisation. But some people like to produce an international environment. With visual aids, one could create something that is common to all, we could educate children in various countries, in Europe and other continents, in a way which gives them the feeling of a common environment. Visual education is neutral and satisfies a feeling of having knowledge in common for human brotherhood. Because I believe that visual aids have this peculiarity, I wish to promote visual education, as an element of human brotherhood.

REFERENCE

[1] An unfinished manuscript, 1945, see Bibl. Nr. 277 – Ed.