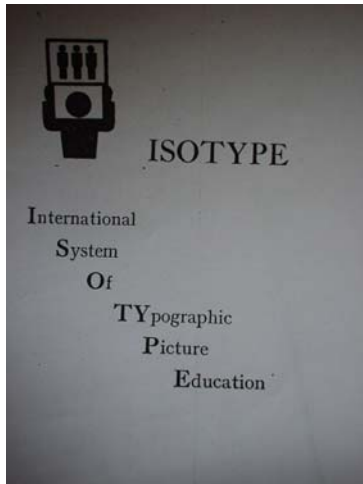


Signification as Observation:
Otto Neurath and the Museum of Society and Economy

Otto Neurath (1882-1945), business school teacher, military officer, junior university professor; Otto Neurath, commissioner for socialization, secretary of a housing movement, sociologist, statistician; Otto Neurath, social critic and philosopher (Cartwright et. al. 1996, 7). His philosophy? “Anti-philosophy,” as he once termed it (Neurath 1983 [1931], 48). A student of turn-of-the-century German social theory – e.g., the writings of Simmel (whose lectures he attended in Berlin), Tönnies, and Weber -- he opposed the prevailing neo-Kantianism that took as its point of departure Kant’s transcendental deduction of *a priori* knowledge. At the same time, he showed equal impatience with nineteenth-century German Idealism and its latter-day descendants: the hermeneutics of Dilthey and Schleiermacher, the *Einfühlungstheorie* of Riehl and Worringer, and most notably the historical pessimism of Spengler. As Neurath would remark in “Anti-Spengler” (1921), Spengler “is a treasure chest for anyone who seeks excuses for unscientific behavior”(Neurath 1973 [1921], 206). Though in his youth Neurath sought unity between the sciences on a purely conceptual level – this coming out in his 1910 review of Wilhelm Wundt’s *Logik* – his thinking after the Spengler essay of 1921, coming on the heels of the First World War, struck an increasingly pragmatic tone. In place of a unified theory of reality, Neurath was to conceive of science as “a kit of standardized tools with which we can cooperate to transform the world,” as Nancy Cartwright and Jordi Cat put it (Cartwright et. al., 176). Neurath fell into line with the thinking of Ernst Mach who theorized in the nineteenth century that science constituted “the greatest possible representation of facts with the least possible expenditure of thought.” (Mach 1883) He sought a system of communication that could apply on a mass scale what empiricist philosophy had shown on a purely theoretical plane, namely that ordinary language was hopelessly inefficient, culturally-specific, and fraught with metaphysical baggage; that ordinary language made claims that were scientifically untenable; that the philosophy of the Vienna Circle offered the only systematic and value-neutral way out.

Neurath’s quest for such a system made a start in his Museum of Society and Economy, which he founded in January 1925. The museum would embody aspects of rational science and social egalitarianism -- anti-Spenglerism at the most concrete level. It replaced the Museum for Housing and Urban Development which Neurath created in 1923 while serving as secretary of the Housing and Allotment Association (Cartwright et. al. 1996, 62-63). However, its intellectual foundations came out of the Museum for War Economy in Leipzig, which Neurath headed from July of 1916 to August, 1918. While the Leipzig museum’s mission was to “commemorate all economic achievements of the First World War” and to create a “centrepoint for the dissemination of knowledge and research in war economy”(Neurath 1918), in the context of Neurath’s career it would be the first place he would work on the issue of visual information. It was here that he was first to use tables, models, and diagrams to display economic statistics. The reason for its importance is that it exposed the urgencies of everyday existence in the context of mass warfare. It fed into Neurath’s preoccupation with functionalism and efficiency, while it further stimulated his interest in social knowledge and technical progress, and (as I’ll try to conclude) ruptured the boundary between reality and representation, war and peace.

As chief curator of the Museum of Society and Economy, Neurath was to employ artists and architects from Austria and Germany, bringing in Josef Jodlbauer, Marie Reidemesiter, and Rosl Weister, later adding Gerd Arntz, Josef Scheer, Erwin Bernath, and Josef Frank, the last of whom he knew from childhood (Cartwright et. al. 1996, 63). Much of the financing for the museum came from the Viennese Council for Workmen and White Collar Workers, the city government of “Red Vienna”, social security insurance funds, and local unions. (Cartwright et. al. 1996, 65) Its principal innovation, the Vienna method of picture statistics (*figure 1*), later renamed ISOTYPE (International System of Typographic Picture Education), would incorporate Neurath’s ongoing critique of Idealist and post-Kantian metaphysics, on the one hand, which



stemmed from his participation in the Vienna Circle ('Der Wiener Kreis'), and his political concerns, on the other, which informed his research at the Museum for War Economy in Leipzig. Neurath's varying interests would allow him to pursue intellectual and activist leanings alike, Mach *and* Marx if we cite but two of his influences. Indeed, his Museum of Society and Economy brought his socialist program into play with the latest developments in international warfare, twentieth-century advertising, and mass industrialization. At the same time, his intimate involvement in the *Wiener Kreis* continued his dialogue with the specialized fields of professional philosophy and theoretical physics.

In a 1933 article for *Survey Graphic*, Neurath would theorize a museum that could be serially produced remarking that "In the future museums will be manufactured, exactly as books are today. But the realization of that idea implies international agreement on a specific method of representation" (Neurath 1973 [1933], 219). Each exhibit had to be "not only correct but also fascinating," (Neurath 1973 [1925], 214), employing "means similar to modern advertisements" (Neurath 1973 [1925], 214), to secure a popular audience. His goal, he maintained, was ultimately 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." (Neurath 1973 [1931], 217) Displays should strive for legibility and personal convenience, as "Even the furniture of the exhibition is to serve the Museum's purpose only and not to detract by sentimental or monumental effects" (Neurath 1973 [1931], 216). Accordingly, in the Museum of Society and Economy Neurath was to ensure that "Size and position of a chart is such that it can be viewed comfortably" (Neurath 1973 [1931], 216). This proved highly effective in terms of attendance numbers. According to Neurath, his museum averaged two thousand visitors daily, far outstripping its peers (Neurath 1936, 73). It was also open evenings, for "The working man has time to see a museum only at night" (Neurath 1936, 72). He celebrated the fact that "some [visitors were] using [his museum] as a sort of waiting-room, and others [were] going there for some minutes everyday for knowledge and amusement" (Neurath 1936, 73). He wanted to bring the museum out of its hermetic confines to the public at large, doing away with the ordinary pomp and circumstance attached to museum visitation.

He furthermore hung charts on partitions that could be moved and rearranged with the use of hooks and fasteners, to make it easier to draw clear juxtapositions between adjacent bodies of information (Neurath 1936, 72). "Less is more," Neurath made note. "The teaching effect will be greater, the memory will be clearer, when only a small number of good pictures has been given, everyone different from the other, and at the same time every one supporting the other" (Neurath 1936, 66-67). He argued that most museums showed greater concern for flaunting the intelligence of the curator than educating the public at large. He believed that museums should provide information relevant to the common individual, rather than simply seeking knowledge as a disinterested end.

We are constantly told that we are living in the age of technique, 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 edgetools, 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 in 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 procured by this means. And yet many people surely would be interested to know what countries particularly are engaged in whaling. And some may want to know what this means for the balance of trade, how it relates to economic crisis, and so on (Neurath 1973 [1933], 219-220).

On balance, Neurath was concerned that the museums of his time had abandoned any ties with everyday life in their pursuit for esoteric detail and egoistic self-promotion. The zeal for aura, authenticity, and uniqueness had effectively undermined any sustainable dialogue between cultural artifacts and technological progress. To him the role of the museum had been relegated over time to the preservation of rare objects for its own sake, surviving on the spectacle value of the artifact alone. “The idea that every museum ought to contain unique exhibits has come to us from the past,” Neurath points out. “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 only see once” (Neurath 1973 [1933], 218). Neurath observations were correct in the sense that nineteenth century museums conceived of their mission as one of collecting and preserving artifacts. At least until the rise of international fairs and exhibitions – e.g., the Exhibition of the Industry of All Nations of 1851 (also referred to as the Crystal Palace Exhibition), museums did not seek to entertain nor instruct on a mass scale.¹ Its patrons were antiquarians, bourgeois collectors, and scholars, not the working class laborer. It aimed at providing comprehensive information, requiring diligence, patience and studious effort on the part of the visitor. One scholar has even asserted that the tradition of standing up inside a museum derives from the nineteenth-century view that comfort led to lethargy, fatigue, and laziness, while keeping visitors on their toes, as it were, would ensure their steady attention (Ferguson 1962, 43). Learning, in other words, was thought to presuppose a level of personal discomfort.

Neurath and his museum could not have been more anathema to this nineteenth-century outlook, as he sought to simplify his displays wherever he could so as not to lose his audience’s attention, e.g., foreigners and the uneducated, not to mention common laborers whose time for leisure was severely constrained: “at the first glance the most important aspect of the subject; obvious differences must be 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... to be rejected as pedagogically unsuitable” (Neurath 1973 [1933], 223). In a clear departure from former practices, Neurath preferred that the public learn a few, reductive facts than to have it overwhelmed by details that could prove intimidating: “to remember simplified pictures,” he noted, “is better than to remember accurate figures” (Neurath 1973 [1933] 220) If museums of the nineteenth-century presupposed a body of knowledge, Neurath addressed his museum to a neutral mass audience who were without strong cultural predilections. He writes, “We may even say that almost no knowledge at all is necessary of the ‘words’ of the picture language – the signs – or of the rules for talking this language – the system” (Neurath 1936, 30). In the name of popular understanding, he had hoped that standardization and serial production would extinguish any false nostalgia for authenticity or ‘aura’. The museums of the future, he held, would furnish pleasure, not exhaustion, entertainment not boredom, and would thereby act, as he stressed late in his career, as a safeguard to democracy. More people would acquire more facts, enabling them to make more educated choices about their circumstances, albeit under the auspices of popular entertainment: “the spreading of knowledge seems to be essential for the smooth working of

democracy” (Neurath 1973 [1945], 230). Bringing knowledge to everyday places would decentralize and hence democratize the process of education (Kräutler 1996, 197).

From the beginning, the Museum of Society and Economy received cultural and social commissions that gave it the mass exposure it needed to gain broad credibility as a democratically inspired method of communication. In May and June of 1925, the museum prepared graphic displays for a Viennese hygiene exhibition. This was followed by contributions to a health, social care, and sport display in Düsseldorf, the International Urban Development Exhibition in Vienna, the Burgenland Fair at Eisenstadt, youth exhibitions in Amsterdam and Berlin, and a hygiene exhibition in Calau (Cartwright 1996, 65). In December of 1927, Neurath collaborated with Josef Frank in organizing a permanent display concerning world economy, the labor movement, population topics, and the city of Vienna (Cartwright 1996, 68). He then established branch museums in Vienna and in Moscow (called ‘Isostat’), where ruling Stalinist government pledged that “all schools, trade unions, [and] public and cooperative organizations” would be retooled according to Neurath’s teachings (Cartwright 1996, 70-71). Though the arrangement with Moscow unraveled as Neurath became increasingly disillusioned with Stalinism, it would in no way stunt his global ambitions, as he would eventually forge working relations with other museums in Berlin, Zagreb, and Klagenfurt, and with the Museum for Science and Industry in Chicago, the technical school in Mannheim, the International Industrial Relations Institute at Amsterdam, and the Hague (Cartwright 1996, 69-70). Neurath dispatched traveling exhibitions throughout Europe, to provincial German towns, the London School of Economics, and to an international education conference in Geneva (Cartwright 1996, 70). In 1933, Neurath was elected specialist member of the CIAM (International Congress of Modern Architecture), the first such non-architect elected in this capacity (Chapel 1996, 172). He also lectured at the CIAM IV Athens Congress, appearing at the invitation of Cornelius van Eesteren, whose *Functional City* proposal owed a significant debt to Neurath’s Vienna method of picture education (Chapel 1996, 167). In order to oversee relations abroad, Neurath set up the Mundaneum Institute in Vienna, which, following Paul Otlet’s *Cité Mondiale* scheme, gathered picture materials from all over the world to help facilitate “museums of man’s development” (Neurath 1936, 109). He moreover created the department of transformation as a subdivision within the Museum of Society and Economy, in order to translate technical information into useful facts intelligible to the layperson. “This [museum] has the great advantage,” Neurath would later note, “that there is one special department which knows exactly what potential visual resources there are to solve any given problem of presentation” (Neurath 1973 [1933], 222).

Around 1928, Neurath and his staff began putting together picturebooks that showcased their research. In addition to its many articles, its earliest full-length publication was *Die bunte Welt*, which was followed by *Gesellschaft und Wirtschaft* (1930), *Technik und Menschheit* (1932), *Wereldverkeer* (1934), *Bildstatistik nach der Wiener Methode in der Schule* (1933), and *Basic by ISOTYPE* (1936). Each text echoed in its own way the group’s joint commitment to making the Vienna method the *lingua franca* of visual communication, its system applied to everything from museum education to airport signs, classroom teaching to cartography. Neurath even predicted the creation of an encyclopedia to catalog his new language, “to make us fully conscious of conditions in which we are living” (Neurath 1936, 104-111). For Neurath’s Vienna method, later renamed ISOTYPE (International System of Typographic Picture Education), would base a system of communication on a repertoire of pictograms that could be mixed and matched according to need. The system’s advantage was that it drew squarely from objects and things derived from reality and discarded anything that could not be observed empirically or scientifically. For it offered an alternative to everyday verbal communication. While ordinary language had to satisfy itself with a symbolic representation of the world, the ISOTYPE was based in visual perception -- it reimagined words as things, symbols as objects, letters as pictures. To put it another way, where ordinary language indulges metaphor and abstraction, Neurath claimed that the ISOTYPE limited itself to what could be known, what we can observe by simple

observation. It sought to promote universal understanding and the lucid comprehension of facts, while ordinary language tended only toward figurative expression, breeding ambiguity and misunderstanding. “Words divide, pictures unite,” Neurath frequently made note (Neurath 1973 [1933], 217). He went on to say in effect that the link between words and things, language and reality, was precisely *not* physical but metaphorical, and that any ideal system of communication had to reference reality by observable means alone.

Neurath’s critique of ordinary language developed in conjunction with his involvement in the *Ernst Mach Verein* (“Ernst Mach Society”), later known as *Der Wiener Kreis*, (“The Vienna Circle”), which he help found in 1928 in order to help bring to general attention what he termed the “Scientific World Conception” (Cartwright 1996, 77). By this time, Neurath had come to the conclusion that any assault on the bourgeoisie had to comprise a critique of traditional metaphysics. It was the Spenglers and Neo-Hegelians of the world, he believed, who proffered a philosophy that advanced the aims of capitalism and blunted the promise of reason. In a reproach against metaphysics, he thus made the point that language was incurably self-referential, unable to signify beyond its own hermetically enclosed system: “*Statements are compared with statements*, not with ‘experiences,’ not with a ‘world’ nor with anything else” (Neurath 1983 [1931], 66) Still earlier, in “The Scientific World Conception: The Vienna Circle”(1929), he and philosophers Hans Hahn and Josef Carnap were to make a similar point, forwarding the classic *Wiener Kreis* argument that statements not grounded in empirical science, that could not be subjected to logical analysis, were simply “empty of meaning” (Neurath 1973 [1929], 306-7). They held that the task of a unified science would be to harmonize the findings of individual researches and to ensure the transmission of scientific ideas to the public at large. Neurath himself saw to the publication of the paper, as he was responsible for securing the publishing support of Arthur Wolf, who eventually printed 5,000 copies of the pamphlet (Cartwright 1996, 78). He then helped set up the journal *Erkenntnis* in 1930, which published the proceedings of the Vienna Circle.

The Vienna Circle rejected the existence of synthetic *a priori* knowledge, that is, Kant’s transcendentalist proposition that the mind possesses intuitions (e.g., space and time) and categories (i.e., the power of negation, cause and effect, et. al.) that exist apart from our apprehension of the world (Neurath 1973 [1929], 308). They regarded language with distrust over the fact that it treated observable things and abstract qualities identically. “Ordinary language,” they were to write, “uses the same parts of speech, the substantive, for things (‘apple’) as well as for qualities (‘hardness’), relations (‘friendship’), and processes (‘sleep’); therefore it misleads one into a thing-like conception of functional concepts (hypostasis, substantialization)” (Neurath 1973 [1929] 308). The members of the Vienna Circle asserted that subjectively felt qualities such as redness or pleasure were to be classified as experience and not knowledge, and that only observable objects and the analytic statements of logic and mathematics were to be thought relevant to the goals of scientific research. They had hoped to replaced philosophy with a kind of “anti-philosophy,” which is to say that they refuted the metaphysical vocation by which philosophy traditionally defined itself. In this respect they were much indebted to the early philosophy of Ludwig Wittgenstein, even if they were ultimately to disagree with his conclusions. In the *Tractatus Logico-Philosophicus* (1922), Wittgenstein had argued that “the correct method in philosophy would really be... to say nothing except what can be said, i.e., propositions of natural science – something that has nothing to do with philosophy” (Wittgenstein 1961 [1922], 151). Though Wittgenstein opposed the metaphysical dalliances of the neo-Kantians, he was still to invoke “the mystische”[the mystical], however, as an ineffable limit that may exist exterior to language. According to Neurath, this appeal to the unknown represented a deviation from rational thought, inviting metaphysical interpretation. Even more so than Wittgenstein, he was thus to endeavor a radical empiricism that tried to eradicate any trace of extra-scientific thinking. “The end of the *Tractatus*,” Neurath writes in “Sociologie in the Framework of Physicalism,”[where Wittgenstein states] ”What we cannot speak about we must pass over in

silence”—is at least misleading in its wording; it sounds as if there were ‘a something’ of which one cannot speak. We should say: if one really wants to abstain from metaphysical mood, “we must pass over into silence” but not ‘about something’(Neurath 1983 [1931], 60).

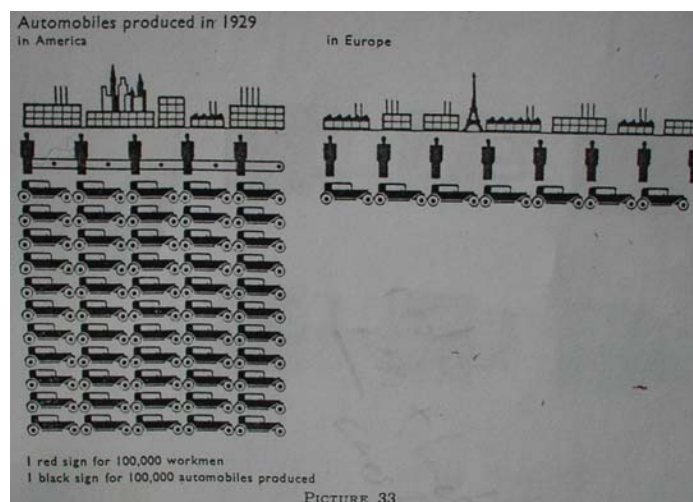
For Neurath, the ISOTYPE, Greek for “shaped alike” (OED), answered to the metaphysical problematics of ordinary language. It derived pictograms for the sole purpose of conveying simplified information in an eminently empirical manner. As he made note in a description of the system, “what we may say about a language picture is very much what we may



say about other things seen by the eye. For example, the man has two legs; the picture-sign has two legs; but he word-sign ‘man’ has not two legs” (figure 2). The point is that the ISOTYPE tried to refute the arbitrary connection between sign and referent, as Ferdinand de Saussure had elsewhere theorized. That is, each pictogram embodied properties that, like reality, could be measured numerically, spatially, or physically. If in ordinary language the assimilation of knowledge takes place by way of representational or symbolic means, the ISOTYPE inaugurated a technique of reading based solely in the materiality of the sign.¹¹ It transmitted information by steadfastly non-metaphysical means, in the sense that it was not mediated by any symbolic sign system, i.e., what you see is literally what you get.

That is to say, the ISOTYPE was for Neurath an empirical way of reading that suited an empirical way of thinking. Its principal rules were that its signs had to be self-explanatory and legible irrespective of color, and they had to be drawn in two-dimensions and combinable according to need. Following the example of the Chinese and Japanese sign systems (Neurath 1936), he thought that by combining the symbols for a shoe and a factory, for instance, one could create the sign for a shoe factory (Neurath 1936, 50). He also held that each symbol had to leave a lasting impression, and that multiple symbols had to be used to designate quantitative differences (Müller 1996, 137): “a greater number of signs is representative of a greater number of things” (Neurath 1936, 73-74) As in a diagram showing among other things the number of automobiles produced in 1929 in Europe and the United States, rather than listing the amounts numerically, Neurath depicted them using an army of pictures (figure 3). For the United States he listed 55 automobiles total (or 5 million cars produced), compared to Europe’s 7 automobiles (or 7 hundred thousand cars produced). The crucial difference, one finds, is not in the precise quantitative differences, but in the approximate proportions:

Americans manufactured a lot more cars in 1929 than did Europeans, and with a great deal fewer factory workers. The way this information is acquired was by simple enumeration and little else. In faithful accordance with the empirical



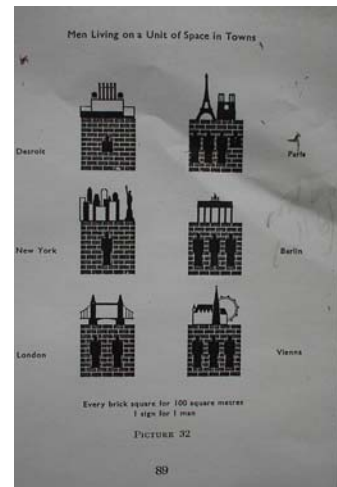
approach, reading takes place here by way of looking, grouping, and counting.

Added to this reconceptualization is a rethinking of the sign as an agent of meaning. In ordinary language, if one literally divides the word ‘men’ in half, one ends up with the letter ‘m’

plus half of 'e' and half of 'e' plus 'n'. On its own, each half is meaningless. By modifying the appearance of the sign, one effectively alters – or annihilates, as the case may be – its essential meaning. Neurath's pictograms, by contrast, forego this condition. In an illustration showing the number of men per hundred square meters in a given city, for instance, Neurath diagramed 3 men per hundred square meters in Berlin, while in Paris he shows that there are 3 ½ men in the same area (*figure 4*). Unlike ordinary language, the halved pictogram preserves the referent 'men', reflecting a difference in amount but not in kind. Half a pictogram reflects the fact that there is one-half man in the area indicated. The sign still carries meaning even if its sign has been halved.

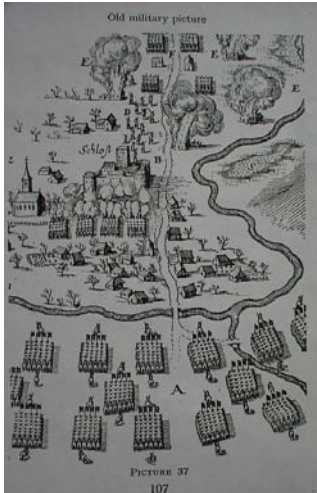
This achievement signals a profound shift in the history of communications theory. If with Friedrich Kittler it may be argued that Nietzsche established the grapheme as an autonomous signifying agent, with Neurath the materialization of the sign comes to full circle: it is with his ISOTYPE that the protocols of reading are rethought along the lines of simple observation. In the everyday realm of experience, if one sees half a man, one still identifies that entity as a man. In like fashion, if one sees half a man in pictogram form, one still can discern the referent to which the picture refers. As in reality, the 'meaning' is maintained even if the original signifier is not. The pictogram, like reality itself, bears a physical link to the signifying sign.

As much as Neurath fashioned his pictograms after physical objects, however, he did not entirely abandon the protocols of ordinary language. For he points out that he intended pictorial statistics to be legible in the manner of books, running left to right, top to bottom. While in everyday experience one's orientation is obviously not bound to such conventions, for Neurath it satisfies the need for legibility. It suggests an admission to the limits of any physicalist notion of language, and it begins to expose some of the ambiguities and difficulties that exist in any rigorously empirical theory of communication. Where does the sign end and reality begin? In Neurath's pictograms, one gains a tangible sign system rooted less in metaphor and more in 'the things themselves'. However, one sacrifices any hard and fast distinction between reality and representation. By relinking word and meaning, the pictogram reimagines the sign as an object open to observational scrutiny. At the same time, one gives up any tangible separation between sign and referent. The fact that he tried to lose the connection between what one sees and what one reads, what one observes and what one interprets, commits him to the still greater problem of not being able to discern a difference: a reality without representation is either all representation or all real, but in either instance a crucial distinction is lost. What is the medium? What is the message? By holding the two apart, one risked metaphysics and metaphoric abstraction, but by putting media and message together, as the ISOTYPE appeared to do, one risked foregoing communication all together. To recall his critique of Wittgenstein, by repressing the "that something" about which language must remain silent, Neurath seemed partially to lose sight of the tangible differences between 'somethingness' and nothingness, reality and illusion. The populist dream of an Enlightened mass public instructed by the ISOTYPE did herald a spirit of internationalism, but only by sacrificing the museum artifact as a distinct expression of historical reality. In transforming the social museum into a venue for public entertainment, Neurath gained the attention of the layperson, but in the process gave up recourse to fact, the things or '*Tatsachen*'. Even as his museum believed itself to restore a properly empirical perspective, in so doing it came to blur reality and the reality of the pictogram. Though Neurath would remain a tireless defender of his methods through the end of his life, in 1945, in certain of his writings he eerily predicted a time when the museum would be fully transformed into a kind of giant pictogram, effectively eliminating the role of history as distinct from representational media. As he would write in *International Picture Language: The*



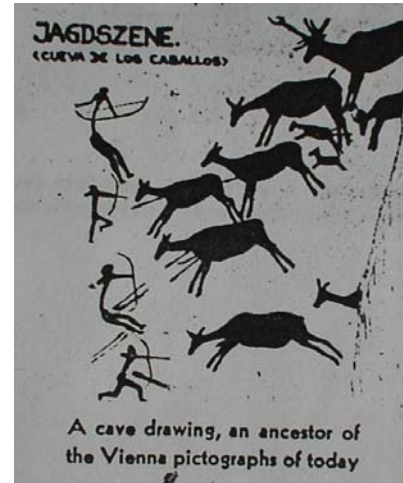
First Rules of ISOTYPE (1936), “An ISOTYPE museum of natural history will have not only animals and plants on view, but maps, number fact pictures, examples of things made from different animals and plants, their part in our existence, etc. So such a museum would be like a great ISOTYPE picture made up of natural things”(Neurath 1936, 68).

The Museum of Society and Economy was to become not only a locus of distracted mass beholding, but the repository of a sign system that doubled as both sign and object, word and thing, media and message. It was to be viewed by one Swedish journalist as a return to Egyptian hieroglyphics, an observation that Neurath would often acknowledge with admiration. He himself was to compare the ISOTYPE to everything from Ancient cave drawings to the struggles of “starving seamen, hungry families of fishermen in the north of Norway,” betraying an affinity for primitivism (*figure 5*).



He was fascinated by Medieval military cartography and its display of stations, troop units, and battles (*figure 6*), and was to interpret it in a way that recalls Siegfried Kracauer’s analysis of the Tiller Girls (Kracauer 1995 [1963]). The representation of a faceless mass infantry committed to the task of survival lent itself to the

functional and need-based principles that Neurath pursued, and prefigured the principles of the ISOTYPE, questioning the metaphysical basis of communication.



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ⁱ As Eugene S. Ferguson has pointed out, museums became agents of mass tastes and sensibilities during the nineteenth century, with the rise of international fairs and exhibitions. This trend is made poignantly clear in a memo written during the construction of Crystal Palace: "instruction and knowledge of the most refined kind should be conveyed through the medium of the eye to all visitors; in a word, that the eye of the sight-seer should never weary of looking, while the mind should almost unconsciously imbibe knowledge, and that of a kind fully equal to the standard of modern excellence" (Silliman et. al. 1854, 18-19).

ⁱⁱ For a discussion of materiality as it relates to signification, see Hans Ulrich Gumbrecht, "A Farewell to Interpretation," *Materialities of Communication*, eds., Hans Ulrich Gumbrecht and K. Ludwig Pfeiffer, tr., William Whobrey (Stanford: Stanford UP, 1994) 389-402.