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Isotype diagrams from Neurath to Doxiadis

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Isotype diagrams in the theories of Otto Neurath and Constantinos Doxiadis are explored in the context of the CIAM conference of 1933 and subsequent positivist contributions to Modernism.

Isotype diagrams from Neurath to Doxiadis

Kostas Tsiambaos

The Austrian philosopher Otto Neurath (Vienna 1882 – Oxford 1945) was the only non-architect who participated in the fourth CIAM conference (Congrès International d'Architecture Moderne) that took place in Athens in the summer of 1933.[1] As we read in the minutes of the congress published in the journal of the Technical Chamber of Greece *Technika Chronika* (Technical Chronicles), it was at the meeting of 13 August 1933 that CIAM members decided to set up two categories of participants: a) partners (mainly young architects and students of architecture), and b) specific members (non-architects participating as full members). The one and only such member was Otto Neurath.[2] Neurath was invited as a representative of the Mundaneum in Vienna in order to cooperate with the CIAM Committee of Statistics which had as its task to collect, review and process statistical data relating to some of the most important cities of the Western world. As noted in the minutes of the congress: 'The Committee of Statistics in cooperation with the Vienna Mundaneum will collect, review and edit the necessary statistical material which will remain as the property of the Conference.'[3]

Otto Neurath in Athens

The lecture by the Austrian was given in French at the Ceremonial Hall of the NTUA (the Neoclassical 'Kaftantzoglou' building) on 4 August 1933 at 8.30 pm. The title of Neurath's lecture – who mistakenly was referred to as Dr. J. Neurath – was 'L'Urbanisme et Le Lotissement du Sol en Representation Optique d'après la Methode Viennoise'*[1–3]*. In his speech Neurath introduced his method by presenting graphic diagrams depicting statistical data on industry, economy, labour, production, etc. Diagrams that could be used – as tools for site analysis – by any modern architect or urban planner.

Neurath emphasised that he cared primarily for the observer (what the observer can see and understand) and that is why he insisted on pictures rather than words and numbers. As he mentioned, the expressive graphic symbols of the Viennese method (what was later called ISOTYPE) were developed and presented to facilitate the understanding of the observer, the average man. The simple images Neurath used gave the impression of 'hieroglyphic representations' and shape, as he said, a kind of a 'pictorial Esperanto'.[4] This picture 'language' is therefore international and is not altered by contact with the different nationalities. It is a language accessible to all people independently of origin or culture.[5] Neurath's 'pedagogic' method, as he characterised it, is based on optical representation (*visualité*), and thus it can provide us with immediately perceptible information in just three steps. Three glances are enough to grasp the whole image:

> *We developed in Vienna a pedagogic method that is based on optical representation* [...] *with the first look we are informed of the most general characteristics, with the second we distinguish the more important phenomena, with the third the particular details. If the fourth look still provides us with some information this means that the picture is not satisfactory enough.*[6]

This concept of the standardisation of a sophisticated but simple visual informational system is what the philosopher Otto Neurath offered to the modern architects and planners of his time.[7] In the end modern architecture as an artistic style (with the narrow significance of an aesthetic tendency) does not have any value for Neurath. What is important for him is the quest for a clear, simple, direct, international way of dealing with urban phenomena.

We could suggest that this process of recording and projecting statistical data through diagrams itself – whether these are Neurath's diagrams or diagrammatic architectural plans – indicates a purely positivistic approach. Embedding information and knowledge through simple diagrams or drawings constitutes an exceptionally 'modern' process in general. The fact that the fourth CIAM had as its subject the *organic* or *functional* city (*la ville fonctionelle*, *Die funktionelle Stadt*) means precisely that CIAM perceived the city as an organism which can (and should) function well. The fact also that very different cities were seen as comparable implies the perception that the modern cities of the Western world are organisms which function in similar ways, are composed from common elements, have common needs, share common characteristics and face the same problems.

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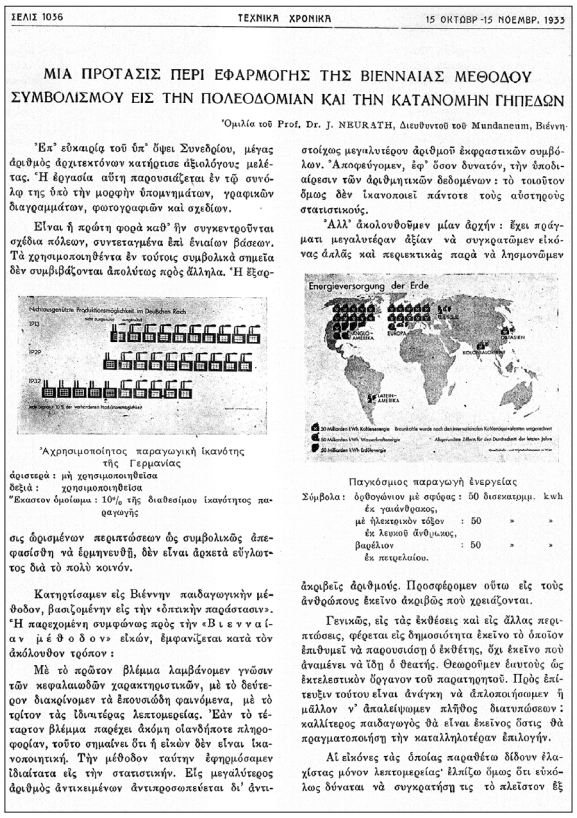


ΣΕΛΙΣ 1036 ΤΕΧΝΙΚΑ ΧΡΟΝΙΚΑ 15 ΟΚΤΩΒΡ.-15 ΝΟΕΜΒΡ. 1933

ΜΙΑ ΠΡΟΤΑΣΙΣ ΠΕΡΙ ΕΦΑΡΜΟΓΗΣ ΤΗΣ ΒΙΕΝΝΑΙΑΣ ΜΕΘΟΔΟΥ ΣΥΜΒΟΛΙΣΜΟΥ ΕΙΣ ΤΗΝ ΠΟΛΕΟΔΟΜΙΑΝ ΚΑΙ ΤΗΝ ΚΑΤΑΝΟΜΗΝ ΓΗΠΕΔΩΝ

Ὁμιλία τοῦ Prof. Dr. J. NEURATH, Διευθυντοῦ τοῦ Mundaneum, Βιέννη.

Ἐπ' εὐκαιρίᾳ τοῦ ὑπ' ὄψει Συνεδρίου, μέγας ἀριθμὸς ἀρχιτεκτόνων κατήρτισε ἀξιολόγους μελέτας. Ἡ ἐργασία αὕτη παρουσιάζεται ἐν τῷ συνόλῳ της ὑπὸ τὴν μορφὴν ὑπομνημάτων, γραφικῶν διαγραμμάτων, φωτογραφιῶν καὶ σχεδίων.

Εἶναι ἡ πρώτη φορὰ καθ' ἣν συγκεντροῦνται σχέδια πόλεων, συντεταγμένα ἐπὶ ἑνιαίων βάσεων. Τὰ χρησιμοποιηθέντα ἐν τούτοις συμβολικὰ σημεῖα δὲν συμβιβάζονται ἁπολύτως πρὸς ἄλληλα. Ἡ ἐξασ-

Ἀχρησιμοποίητος παραγωγικὴ ἱκανότης τῆς Γερμανίας
ἀριστερὰ : μὴ χρησιμοποιηθεῖσα
δεξιὰ : χρησιμοποιηθεῖσα
Ἕκαστον ὁμοίωμα : 10% τῆς διαθεσίμου ἱκανότητος παραγωγῆς

στοίχως μεγαλυτέρου ἀριθμοῦ ἐκφραστικῶν συμβόλων. Ἀποφεύγομεν, ἐφ' ὅσον δυνατόν, τὴν ὑποδιαίρεσιν τῶν ἀριθμητικῶν δεδομένων : τὸ τοιοῦτον ὅμως δὲν ἱκανοποιεῖ πάντοτε τοὺς αὐστηροὺς στατιστικούς.

Ἀλλ' ἀκολουθοῦμεν μίαν ἀρχήν : ἔχει πράγματι μεγαλυτέραν ἀξίαν νὰ συγκρατῶμεν εἰκόνας ἁπλᾶς καὶ περιεκτικὰς παρὰ νὰ λησμονῶμεν

Παγκόσμιος παραγωγὴ ἐνεργείας
Σύμβολα : ὀρθογώνιον μὲ σφῦρα : 50 διεκατομμ. kwh ἐκ γαιάνθρακος,
μὲ ἠλεκτρικὸν τόξον : 50 » »
ἐκ λευκοῦ ἄνθρακος,
βαρέλιον : 50 » »
ἐκ πετρελαίου.

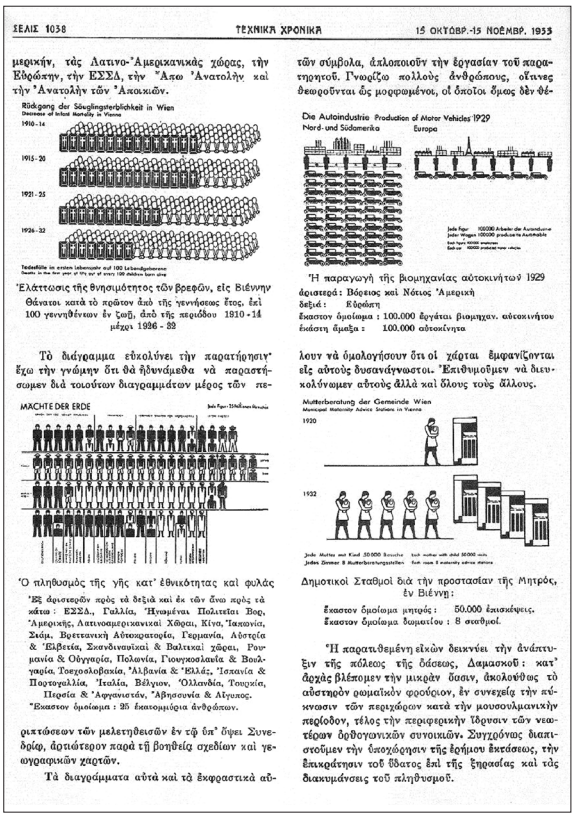
ἀκριβεῖς ἀριθμούς. Προσφέρομεν οὕτω εἰς τοὺς ἀνθρώπους ἐκεῖνο ἀκριβῶς ποὺ χρειάζονται.

Γενικῶς, εἰς τὰς ἐκθέσεις καὶ εἰς ἄλλας περιπτώσεις, φέρεται εἰς δημοσιότητα ἐκεῖνο τὸ ὁποῖον ἐπιθυμεῖ νὰ παρουσιάσῃ ὁ ἐκθέτης, ὄχι ἐκεῖνο ποὺ ἀναμένει νὰ ἴδῃ ὁ θεατής. Θεωροῦμεν ἐντυτοὺς ὡς ἐκτελεστικὸν ὄργανον τοῦ παρατηρητοῦ. Πρὸς ἐπίτευξιν τούτου εἶναι ἀνάγκη νὰ ἁπλοποιήσωμεν ἢ μᾶλλον ν' ἀπαλείψωμεν πλῆθος διατυπώσεων : καλλίτερος παιδαγωγὸς θὰ εἶναι ἐκεῖνος ὅστις θὰ πραγματοποιήσῃ τὴν καταλληλοτέραν ἐπιλογήν.

Αἱ εἰκόνες τὰς ὁποίας παραθέτω δίδουν ἐλαχίστας μόνον λεπτομερείας· ἐλπίζω ὅμως ὅτι εὐκόλως δύναται νὰ συγκρατήσῃ τις τὸ πλεῖστον ἐξ

Κατηρτίσαμεν εἰς Βιέννην παιδαγωγικὴν μέθοδον, βασιζομένην εἰς τὴν «ὀπτικὴν παράστασιν». Ἡ παρεχομένη συμφώνως πρὸς τὴν «Βιεννεζιανὴ μέθοδον» εἰκὼν, ἐμφανίζεται κατὰ τὸν ἀκόλουθον τρόπον :

Μὲ τὸ πρῶτον βλέμμα λαμβάνομεν γνῶσιν τῶν κεφαλαιωδῶν χαρακτηριστικῶν, μὲ τὸ δεύτερον διακρίνομεν τὰ ἐπουσιώδη φαινόμενα, μὲ τὸ τρίτον τὰς ἰδιαιτέρας λεπτομερείας. Ἐὰν τὸ τέταρτον βλέμμα παρέχει ἀκόμη οἱανδήποτε πληροφορίαν, τοῦτο σημαίνει ὅτι ἡ εἰκὼν δὲν εἶναι ἱκανοποιητική. Τὴν μέθοδον ταύτην ἐφημοσσαμεν ἰδιαίτατα εἰς τὴν στατιστικήν. Εἰς μεγαλύτερος ἀριθμὸς ἀντικειμένων ἀντιπροσωπεύεται δι' ἀντι-



ΣΕΛΙΣ 1038 ΤΕΧΝΙΚΑ ΧΡΟΝΙΚΑ 15 ΟΚΤΩΒΡ.-15 ΝΟΕΜΒΡ. 1933

μερικήν, τὴς Λατινο-Ἀμερικανικὴς χώρας, τὴν Ἐδιθώκην, τὴν ΕΣΣΔ, τὴν Ἄπω Ἀνατολὴν καὶ τὴν Ἀνατολὴν τῶν Ἀποικιῶν.

Rückgang der Säuglingsterblichkeit in Wien
Decrease of Infant Mortality in Vienna
1910-14
1915-20
1921-25
1926-32

Die Autoindustrie Production of Motor Vehicles 1929
Nord- und Südamerika
Europa

Ἡ παραγωγὴ τῆς βιομηχανίας αὐτοκινήτων 1929
ἀριστερὰ : Βόρειος καὶ Νότιος Ἀμερικὴ
δεξιὰ : Εὐρώπη
Ἕκαστον ὁμοίωμα : 100.000 ἁρμάται βιομηχαν. αὐτοκινήτου
ἑνὸς ἅμαξα : 100.000 αὐτοκίνητα

Ἐλάττωσις τῆς θνησιμότητος τῶν βρεφῶν, εἰς Βιέννην
Θάνατοι κατὰ τὸ πρῶτον ἀπὸ τῆς γεννήσεως ἔτος, ἐπὶ 100 γεννηθέντων ἐν ζωῇ, ἀπὸ τῆς περιόδου 1910-14 μέχρι 1926-32

Τὸ διάγραμμα ἐπιτρέπει τὴν παρατήρησιν· ἔχω τὴν γνώμην ὅτι θὰ ἠδυνάμεθα νὰ παραστήσωμεν διὰ τοιούτων διαγραμμάτων μέρος τῶν πε-

MACHT DER ERDE

Ὁ πληθυσμὸς τῆς γῆς κατ' ἐθνικότητας καὶ φυλάς
Ἐξ ἀριστερῶν πρὸς τὰ δεξιὰ καὶ ἐκ τῶν ἄνω πρὸς τὰ κάτω : ΕΣΣΔ., Γαλλία, Ἡνωμένα Πολιτεῖαι Βορ. Ἀμερικῆς, Λατινοαμερικανικαὶ Χῶραι, Κίνα, Ἰαπωνία, Σκάνδ. Βρετανικὴ Αὐτοκρατορία, Γερμανία, Αὐστρία & Ἑλβετία, Σκανδιναυϊκαὶ & Βαλτικαὶ χῶραι, Ρουμανία & Οὐγγαρία, Πολωνία, Γιουγκοσλαυία & Βουλγαρία, Τσεχοσλοβακία, Ἀλβανία & Ἑλλάς, Ἰσπανία & Πορτογαλλία, Ἰταλία, Βέλγιον, Ὁλλανδία, Τουρκία, Περσία & Ἀργεντινή, Ἀβησσυνία & Λίβυσσος.
Ἕκαστον ὁμοίωμα : 25 ἑκατομμύρια ἀνθρώπων.

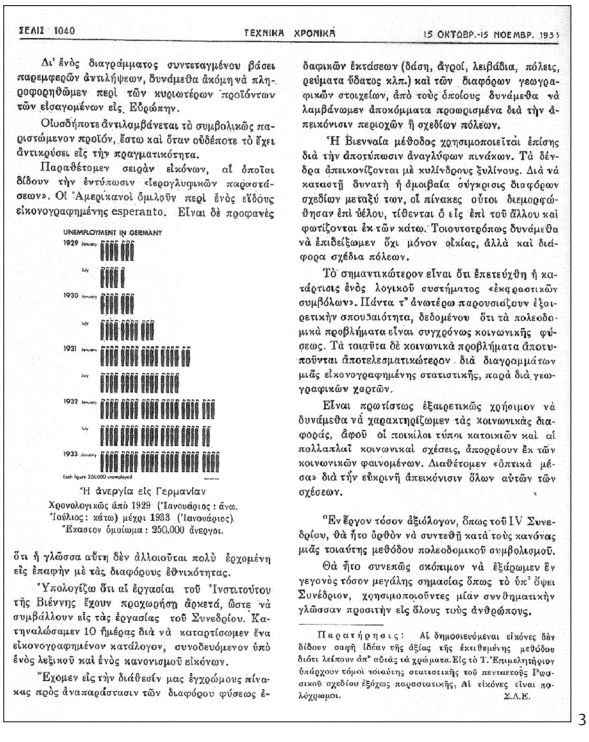
ριπτώσεων τὰν μελετηθεισῶν ἐν τῷ ὑπ' ὄψει Συνεδρίῳ, ἀρτιώτερον παρὰ τῇ βοηθείᾳ σχεδίων καὶ γεωγραφικῶν χαρτῶν.

Τὰ διαγράμματα αὐτὰ καὶ τὰ ἐκφραστικὰ αὐτῶν σύμβολα, ἁπλοποιοῦν τὴν ἐργασίαν τοῦ παρατηροῦντος. Γνωρίζω πολλοὺς ἀνθρώπους, οἵτινες θεωροῦνται ὡς μορφωμένοι, οἱ ὁποῖοι ὅμως δὲν θέ-

Δημοτικοὶ Σταθμοὶ διὰ τὴν προστασίαν τῆς Μητρός, ἐν Βιέννῃ :
Ἕκαστον ὁμοίωμα μητρὸς : 50.000 ἐπισκέψεις.
Ἕκαστον ὁμοίωμα δωματίου : 8 σωθέντα.

Ἡ παρατιθεμένη εἰκὼν δεικνύει τὴν ἀνάπτυξιν τῆς πόλεως τῆς ὁάσεως, Δαμασκοῦ : κατ' ἀρχὰς βλέπομεν τὴν μικρὰν ὄασιν, ἀκολούθως τὸ αὐστηρὸν ρωμαϊκὸν φρούριον, ἐν συνεχείᾳ τὴν πύκνωσιν τῶν περιοίκων κατὰ τὴν μουσουλμανικὴν περίοδον, τέλος τὴν περιφερικὴν ὑδρευσιν τῶν νεωτέρων ὁρθογωνικῶν συνοικιῶν. Συγχρόνως διαπιστοῦμεν τὴν ὑποχώρησιν τῆς ἀρήμου ἐκτάσεως, τὴν ἐπικράτησιν τοῦ ὕδατος ἐπὶ τῆς ξηρασίας καὶ τὰς διακυμάνσεις τοῦ πληθυσμοῦ.

1–3 Neurath's lecture as published in the *Technika Chronika* journal



ΣΕΛΙΣ 1040 ΤΕΧΝΙΚΑ ΧΡΟΝΙΚΑ 15 ΟΚΤΩΒΡ.-15 ΝΟΕΜΒΡ. 1933

Δι' ἑνὸς διαγράμματος συντεταγμένου βάσει παρεμφερῶν ἀντιλήψεων, δυνάμεθα ἀκόμη νὰ πληροφορηθῶμεν περὶ τῶν κυριωτέρων προϊόντων τῶν εἰσαγομένων εἰς Εὐρώπην.

Οἱουδήποτε ἀντιλαμβάνεται τὸ συμβολικῶς παριστώμενον προϊόν, ἔστω καὶ ὅταν οὐδέποτε τὸ ἔχει ἀντικρύσει εἰς τὴν πραγματικότητα.

Παραθέτομεν σειρὰν εἰκόνων, αἱ ὁποῖαι δίδουν τὴν ἐντύπωσιν «ἱερογλυφικῶν παραστάσεων». Οἱ Ἀμερικανοὶ ὁμιλοῦν περὶ ἑνὸς εἴδους εἰκονογραφημένης esperanto. Εἶναι δὲ προφανὲς

UNEMPLOYMENT IN GERMANY
1929 January
July
1930 January
July
1931 January
July
1932 January
July
1933 January

Ἡ ἀνεργία εἰς Γερμανίαν
Χρονολογικὸς ἀπὸ 1929 (Ἰανουάριος : ἄνω. Ἰούλιος : κάτω) μέχρι 1933 (Ἰανουάριος).
Ἕκαστον ὁμοίωμα : 250.000 ἄνεργοι.

ὅτι ἡ γλῶσσα αὕτη δὲν ἀλλοιοῦται πολὺ ἐρχομένη εἰς ἐπαφὴν μὲ τὰς διαφόρους ἐθνικότητας.

Ὑπολογίζω ὅτι αἱ ἐργασίαι τοῦ Ἰνστιτούτου τῆς Βιέννης ἔχουν προχωρήσῃ ἀρκετά, ὥστε νὰ συμβάλλουν εἰς τὰς ἐργασίας τοῦ Συνεδρίου. Κατηναλώσαμεν 10 ἡμέρας διὰ νὰ καταρτίσωμεν ἕνα εἰκονογραφημένον κατάλογον, συνοδευόμενον ὑπὸ ἑνὸς λεξικοῦ καὶ ἑνὸς κανονισμοῦ εἰκόνων.

Ἔχομεν εἰς τὴν διάθεσίν μας ἔγχρωμους πίνακας πρὸς ἀναπαράστασιν τῶν διαφόρου φύσεως ἐδαφικῶν ἐκτάσεων (ὁάση, ἀγροί, λειβάδια, πόλεις, ρεύματα ὕδατος κλπ.) καὶ τῶν διαφόρων γεωγραφικῶν στοιχείων, ἀπὸ τοὺς ὁποίους δυνάμεθα νὰ λαμβάνωμεν ἀποκόμματα προωρισμένα διὰ τὴν ἀπεικόνισιν περιοχῶν ἢ σχεδίων πόλεων.

Ἡ Βιεννεζὶ μέθοδος χρησιμοποιεῖται ἐπίσης διὰ τὴν ἀποτύπωσιν ἀναγλύφων πινάκων. Τὰ ὄνδρα ἀπεικονίζονται μὲ κυλίνδρους ξυλίνους. Διὰ νὰ καταστῇ δυνατὴ ἡ ἀμοιβαία σύγκρισις διαφόρων σχεδίων μεταξύ των, οἱ πίνακες οὗτοι διεμορφώθησαν ἐπὶ ὁθλου, τίθενται ὁ εἷς ἐπὶ τοῦ ἄλλου καὶ φωτίζονται ἐκ τῶν κάτω. Τοιουτοτρόπως δυνάμεθα νὰ ἐπιδείξωμεν ὄχι μόνον οἰκίας, ἀλλὰ καὶ διεφορα σχέδια πόλεων.

Τὸ σημαντικώτερον εἶναι ὅτι ἐπιτεύχθη ἡ κατάρτισις ἑνὸς λογικοῦ συστήματος «ἐκφραστικῶν συμβόλων». Πάντα τ' ἀνωτέρω παρουσιάζουν ἐξαιρετικὴν σπουδαιότητα, δεδομένου ὅτι τὰ πολεοδομικὰ προβλήματα εἶναι συγχρόνως κοινωνικῆς φύσεως. Τὰ τοιαῦτα δὲ κοινωνικὰ προβλήματα ἀποτυποῦνται ἀποτελεσματικώτερον διὰ διαγραμμάτων μιᾶς εἰκονογραφημένης στατιστικῆς, παρὰ διὰ γεωγραφικῶν χαρτῶν.

Εἶναι πρωτίστως ἐξαιρετικῶς χρήσιμον νὰ δυνάμεθα νὰ χαρακτηρίζωμεν τὰς κοινωνικὰς διαφορὰς, ἀφοῦ οἱ ποικίλοι τύποι κατοικιῶν καὶ αἱ πολλαπλαῖ κοινωνικαὶ σχέσεις, ἀπορρέουν ἐκ τῶν κοινωνικῶν φαινομένων. Διαθέτομεν «ὀπτικὰ μέσα» διὰ τὴν ἐθκρινῆ ἀπεικόνισιν ὅλων αὐτῶν τῶν σχέσεων.

Ἓν ἔργον τόσον ἀξιόλογον, ὅπως τοῦ IV Συνεδρίου, θὰ ἦτο ὀρθὸν νὰ συντεθῇ κατὰ τοὺς κανόνας μιᾶς τοιαύτης μεθόδου πολεοδομικοῦ συμβολισμοῦ.

Θὰ ἦτο συνετὸς σκόπιμον νὰ ἐξέλθωμεν ἔν γεγονὸς τόσον μεγάλης σημασίας ὅπως τὸ ὑπ' ὄψει Συνέδριον, χησιμοποιοῦντες μίαν συνθηματικὴν γλῶσσαν προσιτὴν εἰς ὅλους τοὺς ἀνθρώπους.

Παρατήρησις : Αἱ δημοσιευόμεναι εἰκόνες δὲν δίδουν σαφῆ ἰδέαν τῆς ἀξίας τῆς ἐπιτευχθείσης μεθόδου διότι λείπουν ἀπ' αὐτὰς τὰ χρώματα. Εἰς τὸ Τ. Ἐπιμελητήριον διάφορον τόμοι τοιαύτης στατιστικῆς τοῦ πεντηκοστοῦ Ρωσικοῦ σχεδίου ἐξέχουν παρισταστικῆς. Αἱ εἰκόνες εἶναι πολύχρωμοι. Σ.Λ.Ε.

What became clear in the CIAM of 1933 was the need of its members to reach an objective system of isolating and presenting these common characteristics that every developed city has. However, to arrive at this, it was important first to introduce suitable tools for observing and recording these new urban conditions and phenomena. What Neurath presented in Athens is such a formalistic tool. A tool that attributes its clarity to the very simple graphic language it uses. A tool that is as 'international' as the white, cubic buildings of modern architecture are, from Greece up to Sweden and from Switzerland across to Hungary.

In a way, the above scheme links Neurath's work to Ernst Neufert's *Bauentwurfslehre*.[8] Both are interested in offering a system as rational and objective as possible, a specific scientific method that can be used by all; a valuable, condensed and codified body of knowledge that can help everyone – architect or not – to work safely, quickly and efficiently. The method of Neurath, in the hands of a planner, and the handbook of Neufert, in the hands of an architect, were intended as tools that should be used, having always in mind the needs of the citizens of the developed cities in the Western world.

These abstract little men that both Neurath and Neufert use in their diagrams are there to remind us that their measure – literally and symbolically – is the average man: the everyday man who lives and works in the modern city, trying to find his place in an alienated and often hostile environment.

Economy, standardisation, ergonomics, productivity are the values in the minds of both the Austrian philosopher and the German architect. Buildings, cities, infrastructures must be designed to serve human activities in everyday life and to ameliorate living conditions. For this reason, these new methods and techniques were intended to become tools in the hands of a wider technocratic public; tools that everyone, if interested, could acquire easily and at a small price. That is why the 'products' offered to the public by both Neurath and Neufert

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are printed maps, diagrams, books, encyclopaedias. Whether this is Neurath's *Gesellschaft und Wirtschaft*[9] or Neufert's *Bauentwurfslehre*, these encyclopaedias both move in the direction of constituting a modern *lingua universalis*, following the tradition of Hobbes, Leibniz or Bentham – aiming to revive in the modern era the humanistic project of enlightenment.

It seems though that not all were willing to follow this paradigm. This rational standardisation that was proposed by Neurath during the Fourth CIAM soon became annoying to some. The truth is that for certain CIAM members such as Cornelis van Eesteren, or Sigfried Giedion, the work of Neurath, instead of constituting a tool of work, was encountered in practice as a tool of control, and as a restriction of architectural freedom and creativity. Consequently, just a few months after the Congress, they began to look with scepticism at Neurath's ISOTYPE diagrams and to feel that these particular diagrams – which had not been designed with the creative logic of the architect-artist but with the sterile logic of a social scientist – could not take into consideration the complexity of the modern city.[10] Thus, according to van Eesteren, Neurath's abstract picture-diagrams downgrade the 'psychological and human factor'.[11] In other words, van Eesteren recognised Neurath's extreme standardisation as a problem since it threatened the subjective-psychological dimension of architecture, a dimension which Neurath ignores in order to deal with those factors which he regarded as usually universal and generic.

Even if we do not know precisely what van Eesteren had in mind, we can suppose that the moment he refers to psychology he tries to reverse Neurath's technocratic logic by introducing a factor which is not measurable, and is not subject to any objective factors and criteria. If, however, according to van Eesteren this 'psychological-human factor' is important it is not at all clear in which ways somebody can take this factor into consideration – how can psychology be evaluated? How can something so general and unspecified become incorporated in architecture and urban planning? These are questions which perhaps Neurath himself would ask, knowing that a clear answer does not exist and understanding that he has to deal with a totally different theoretical approach, an approach which finds him at the opposite side. For Otto Neurath, the moment when factors which cannot be checked or verified are imported by the back door, the scientific (read objective) character of modern architecture is undermined, the effectiveness of its actions are disputed, its socialist vision is downgraded.

Doxiadis's science

During the Second World War Constantinos Doxiadis (1913–1975) with a few friends and colleagues, began the hard and extended work of recording the war damage and destruction in Greece. During the same period Doxiadis founded the 'Kyklos Tecnikon' (Circle of Technicians) which between 1942 and 1943 gave lectures on subjects concerning urban planning, economy, public health etc. with regard to the cities and settlements in Greece. The outcome of this extended research was assembled and recorded in multiple texts, charts, maps, tables and diagrams.[12]

In 1944, after the end of war in Greece, Doxiadis – as the head of the Ministry of Reconstruction – organised a report on the country's destruction. This report soon took the form of an exhibition entitled *Such was the War in Greece*, an exhibition that travelled internationally from Paris to San Francisco where Doxiadis participated in the Founding Conference of the United Nations as a member of the Greek delegation. The aim of this exhibition was to make comprehensible, in a simple and direct way, the war damage in the Greek settlements. In a report of the architect Dimitris Moretis (head of the exhibitions department of the Ministry of National Economy) to the executive committee of the exhibition we read about the concept and the philosophy of the exhibition:[13] 'The fact should not escape us that the realisation of this exhibition should not be much different from the staging of a theatrical play. This exhibition also needs a) script b) direction c) stage design.'[14]

Moretis is talking about an exhibition which was not addressed to any special scientists, but to the average man, to the wider public, the interest of which could only be attracted through clear and 'bright impressions'.[15] Doxiadis embraces this concept, his quadrilingual publication of 1946, entitled *Ai Thysiai tis Ellados ston Deftero Pagkosmio Polemo* (The Sacrifices of Greece in the Second World War), was filled with coloured maps, tables and diagrams – pictures that follow Neurath's ISOTYPE *[4–7]*.[16] It is an odd fact, however, that nowhere in this publication are the name of the Austrian philosopher, or his methodology, mentioned; there is not a single reference, note, directive or comment that would relate Doxiadis's book to Neurath's work.

It is of course no secret that Doxiadis knew the method of Otto Neurath since he had attended the Fourth CIAM as a student in the National Technical University of Athens where Neurath had given his lecture in August 1933. But even if he was not present during Neurath's lecture, he would have certainly read it when it was published later in the *Technica Chronica* journal. What had happened then? Should we consider that Doxiadis 'forgot' Neurath's diagrams and pictures in the years that intervened? Should we think that he did not consider it essential to refer to such a famous method? The fact is that Doxiadis did such organised and methodical work in the Ministry of Reconstruction that it does not seem possible that he failed to acknowledge the work of the famous Austrian.

We may also consider, as an indirect influence for Doxiadis's book, the work of the Austrian Rudolf Modley. Modley, who was born in Vienna in 1906, was deeply influenced by Otto Neurath. Early in 1930 he emigrated to the United States where he worked as a curator in the Museum of Science and Industry of Chicago, under the supervision of the nephew of Neurath, Waldemar Kaempffert. There he began to work as an illustrator for periodicals, newspapers and advertising booklets using the Viennese graphic method introduced by Otto Neurath.[17] In 1943

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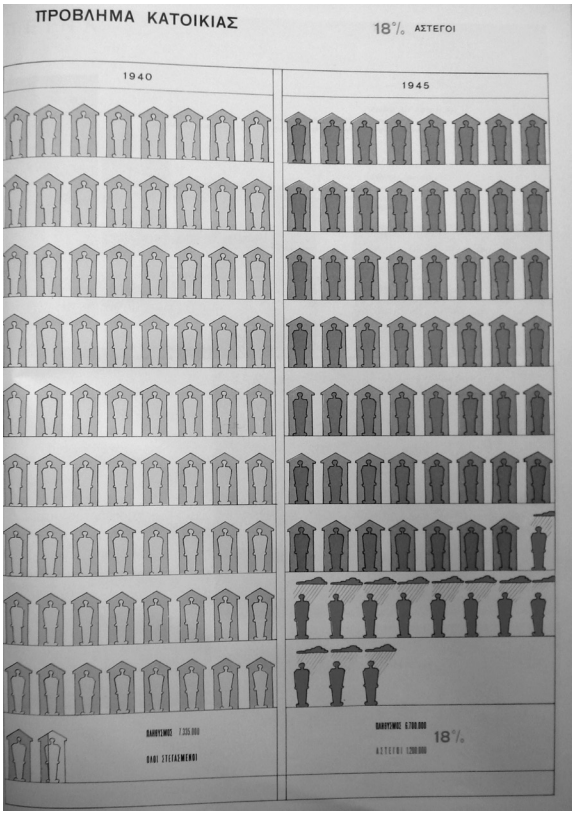

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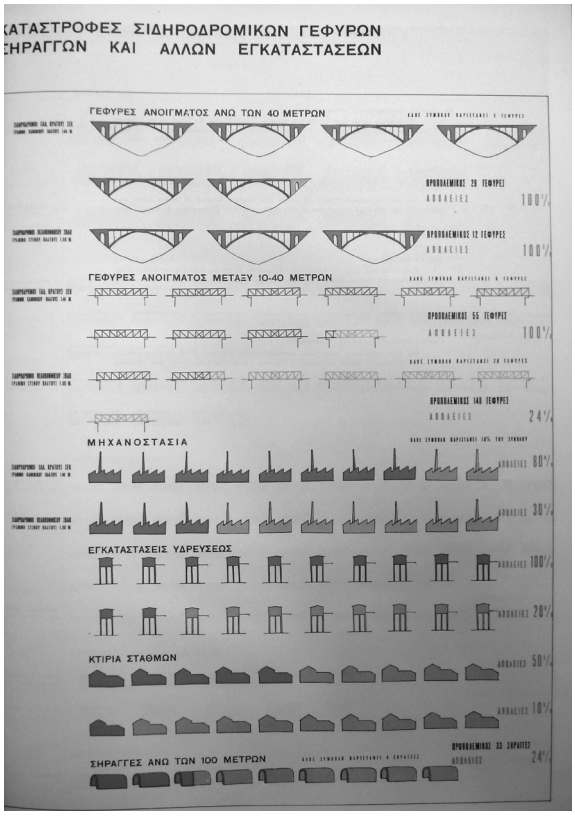

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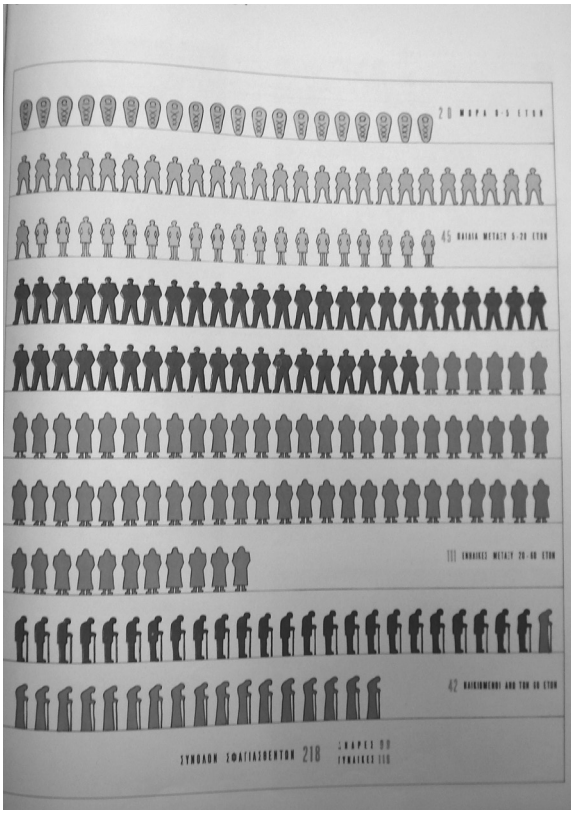

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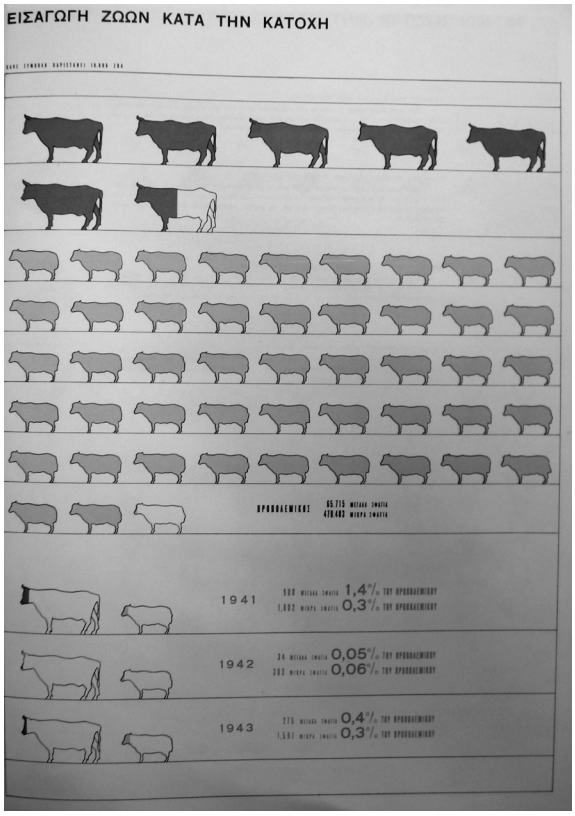

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4–7 Doxiadis's analysis of the war damage in Greece following Neurath's method

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Modley published a book entitled *A History of the War in Maps, Pictographs, in Words,* that was a graphical recording of war damage using the known 'Viennese method'.[18] Modley's book thus bears a direct relation to the research Doxiadis did for Greece during the same period since both shared the same methodology and had the same target.[19]

Another inspiration for Doxiadis could be considered the book co-authored by the famous Catalan architect José Luis Sert and CIAM entitled *Can our Cities Survive?*[20] In this publication of 1942, Sert presented maps and diagrams Neurath did just after the Fourth CIAM in 1933, but which had never been published before. These were actually maps and diagrams explaining the concept and the characteristics of the organic city through Neurath's 'Viennese method'. It is interesting though that Sert, as had also happened with Doxiadis's book (but for other reasons), nowhere referred to the name of the Austrian philosopher, even if he consciously published the tables made by Neurath after the Fourth CIAM.[21]

It is very likely that Sert's well known publication of 1942 would have found itself into the hands of Doxiadis. A search in the material of that period in the Doxiadis Archives reveals the continuous contacts that Doxiadis had with his collaborators. These were Greek architects who, in the 1944–46 period, were obtaining scholarships from the British Council to study at famous British universities, and then returning as experts on urban planning issues.[22] Experts, that is to say, absolutely essential for the important work of the reconstruction of their country. But Doxiadis himself also frequently travelled throughout Europe in the same period, making contacts with important technocrats and politicians, becoming informed on the reconstruction efforts in other countries, and on his part informing them about the difficult situation prevailing in his own country.

It is true that Doxiadis, as a rational and pragmatic architect, found in Neurath's picture-diagrams an effective and comprehensible way of presenting the war damage in Greece to a wider international public. It seems that Doxiadis did not find any use in inventing his own method of data analysis since for him real science – which is what he considered architecture and urbanism should be – advances only when it is based on an already established research and methodology. Although there is no sound evidence for Doxiadis's inspiration for his book *Ai Thysiai …* , we cannot but accept that it is the positivist spirit of Modernism that survives in Doxiadis's approach. It is no coincidence that during that period, just after the end of the Second World War, Doxiadis realised that the existing model of the architect should change and that what society needed was no more architects trained as artists, but architects trained as scientists. As he characteristically wrote in one of his late texts: 'The architects of the past began as craftsmen and developed as archi-technicians. Now, archi-technicians, the current architects, need to deal with architecture in a scientific way.'[23] And also: 'The architect should become a scientist in his approach. He should learn the objective, scientific method of experimentation, effort, learning, improvement, experimentation again, and so on and so forth.'[24]

This finding led Doxiadis to introduce the science of Ekistics, a 'condisciplinary' science of human settlements, which unlike other disciplines focusing only on one area of study – either society (sociology) or buildings (architecture or urbanism) – draws upon the knowledge of economics, social science, technical disciplines and cultural disciplines. To achieve this 'scientific totality' Doxiadis introduces his own visual method based on a two-way classificatory diagrammatic scheme. A scheme working with scale – ranging from the individual, the room and the house to the urban region, the continent and the world city (ecumenopolis) – and with 'elements' (nature, man, society, shells and networks) *[8]*. Thus Ekistics is actually based on a schematic organisation, an information mapping of the various relations between the human being and its natural and cultural environment in every possible scale.

Therefore, Constantinos Doxiadis's conviction that 'science and method is the only way' existing in order to design a modern city made him consider and 'construct' his own science, Ekistics, as a new paradigm. Where architecture and urban planning could not provide solutions to new threatening problems, Ekistics emerged for Doxiadis as the only solution. Even if Ekistics has eventually failed to establish its credentials as an independent science, what remained important for Doxiadis was the consideration that to be creative an architect should implement the scientific logic of other disciplines enriching and refining personal methodologies to provide solutions to complicated and intense problems. In other words Doxiadis tried to deny the traditional role of the architect or planner of the nineteenth century – the ideal of a master designer who draws lines on a 'tabula rasa' – and promoted himself as a twentieth-century scientist whose tools are the graphs, the maps, the statistical charts.

That was more or less the view of a known idol of young Doxiadis – Le Corbusier. In his early books, Le Corbusier – an architect whose book *Précisions* Doxiadis had translated into Greek when still a student – used an extreme technocratic language to present statistical data, studies and diagrams which 'testify' to the dead end that he thought Paris was coming to. Le Corbusier argued that the growth of large urban conurbations had exceeded all expectations and that the existing structures could not serve future necessities. How does he support this? The graphs of Paris's statistics provide the necessary proof: 'Statistics show the past and describe the future [...] Statistics is indispensable.'[25]

For Le Corbusier statistics could provide the exact dimension of the phenomenon. Presenting its course of development and following the statistical curves, planners were able to take prompt action, thus preventing negative future development. There was no doubt about this: 'Statistics reveal the exact situation at the time [... through statistics] one feels

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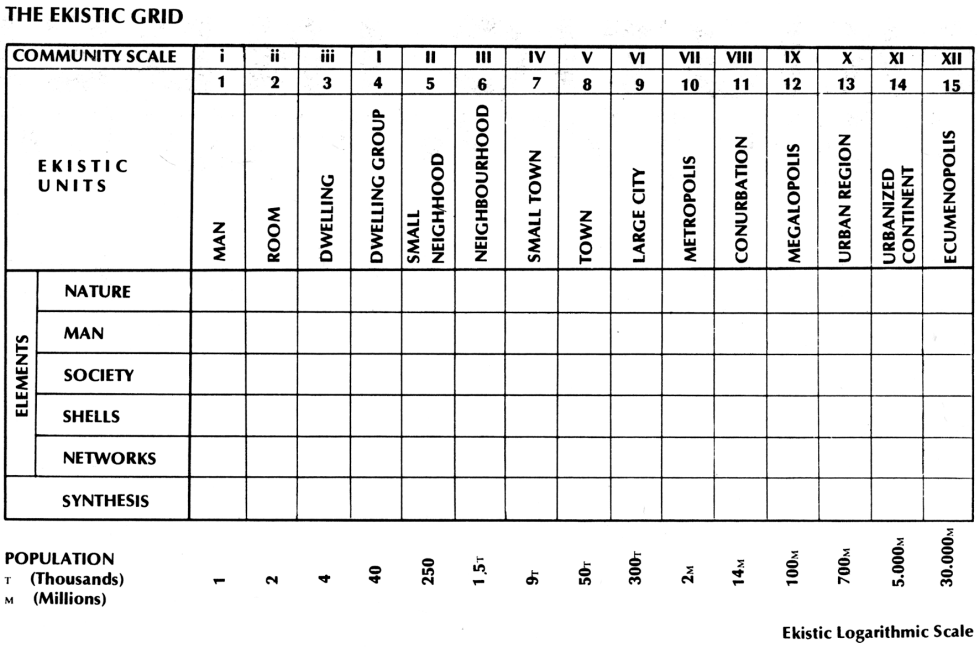

8 Doxiadis's Ekistic grid

9 'The Death of the Human City' diagram by Doxiadis

confident and can predict the future by following the organisation of the statistical curve.'[26]

Statistics could seclude and express the most important information, and provide the perfect solution. Ultimately, it was not necessary to know all the complex parameters of a problem. If one followed the diagrams it would be possible to take the right decisions and act with surety: 'Thanks to statistics, one who is initially unaware of the complexity of a problem can instantaneously acquire knowledge and decide creatively on the right directions to take.'[27]

Doxiadis, like Le Corbusier in *Urbanisme* before him, emerged as the type of architect who, before all else, designed the methods which would enable him to act. By collecting and organising data from different scientific fields, he developed the strategies for attacking the problems of urbanism. In this interdisciplinary design approach, the first step in drawing up a proposal was not a sketch on a white piece of paper, but systematic data collection.

It is obvious that from the late 1940s onwards, Doxiadis had been trying to find a scientific approach, a technique that could codify data and schematise it in diagrams which would finally lead to the objective, which was a total urban design. The city, its history, economy and human behaviour all come under the microscope of a scientific study. In Doxiadis's work, statistics and diagrams as a method of data organisation played the most important role describing the strategy to be followed. These techniques were applied to a number of variables: population (growth rates, densities, distribution), resources (water, energy, food, minerals in this order of priority according to their scarcity), habitable land rated according to development cost (climate, topography, drinkable water), income. Other techniques (e.g. technology and cybernetics) and variables (e.g. education, health) were also taken into consideration in an effort to further refine the different projections. The information obtained through these techniques, in correlation with each other or independently, narrowed the width of the 'hazy zones'. The more variables considered, the sharper the image of the 'City of the Future'.

> *Man, in this case the average American citizen, spends 76% of his life-time at home (males 69% and females 83%), and 24% away from it. He spends 36% sleeping, 20% working, and 10% eating, dressing and bathing. He is left with 34% or one third of his life, for leisure, pleasure, thought, etc. It is this one third which constitutes the basic difference between man and animal. But males between 20 and 59, have only 20% of free time, of which one third is spent in commuting. This means 90 minutes; but for some people it means 3 hours or two thirds of their free time.*[28]

What Doxiadis dreamt of was the improvement of everyday human life, which cannot be achieved other than through direct multilateral action. Because, in the end, what is the meaning of technology if it cannot improve the standards of everyday life? A characteristic example of this is urban transportation:

> *Let us think of transportation. Until the eighteenth century, urban man lived at an average maximum distance of ten minutes from any city centre. This time increased during the railroad era, and has now extended to about one hour in the great metropolises. In spite of the high speeds of which we are so proud, the large cities of the world today can be crossed at an average speed of nine miles per hour – the same rate of progress of horse-driven carts at the beginning of the century. What does it matter that we can ride instead of walk?*[29]

Doxiadis could not design without this preparation, and his specific choices were justified by this interdisciplinary study. Certainly, the objective was still to produce work, but data collection became of particular interest. Wherever phenomena could not be explained by standing knowledge, he developed new forms, concepts, tools and methods; maps were redesigned imaginatively, and problems were reconceptualised.

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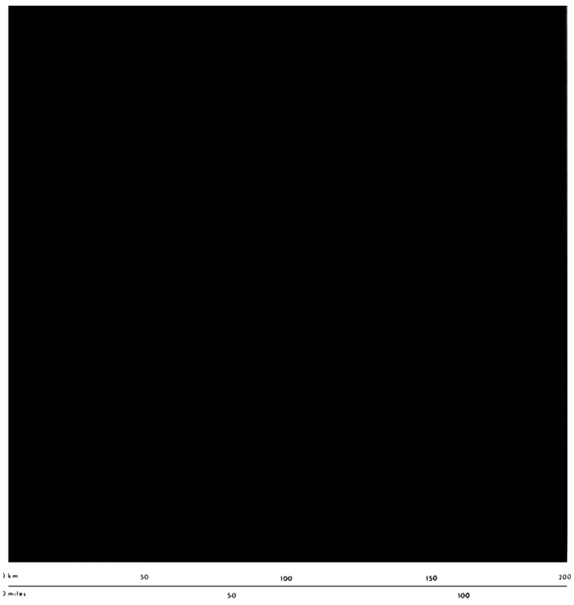

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What was also redesigned was the terminology Doxiadis used by introducing new terms and concepts with ease. He constructed new words, in the same way as he composed new procedures, in an attempt to shed light on the complexity of urban phenomena. At the same time – through words such as Dynametropolis, Dynapolis, Dystopia, Ecumenopolis, Ekistics, ELS (Ekistic Logarithmic Scale), LANWAIR (Land, Water, Air), PreTheDe (PRevention,THerapy and DEvelopment), SMSA (Standard Metropolitan Statistical Area), HUCO (Human Community), COF (City of the Future) etc. – he aimed to introduce to the world the alien forms which might emerge in the future and lead to a different way of living, thereby codifying and conceptualising manageable thoughts of a new environment. Consequently, these 'ideas' were not so much the result of an artist's personal insight but the outcomes of systematic data processing aiming at the definition of a future 'network metalanguage'.[30]

Doxiadis's concern was to act as a scientist whose studies and projects will allow the smooth transition to the 'Ecumenopolis' – another word invented in 1961 by Doxiadis – from the Greek οικουμένη (world) and πόλις (city) – describing the future continuous and unique global city, the new urban Pangaea.[31] Doxiadis receives warnings about the future, the year 2120 when it is expected that 'the population of the earth will have levelled off at a minimum of 20,000,000,000 people' and when he ascertains that the cities of this era will reach a dead end. In a speech given in 1972, a few years before his death, Doxiadis presented a diagram entitled 'The Death of The Human City'.[32] What the diagram shows actually is nothing more than one black rectangle with a scale below *[9]*. In other words the diagram does not really show anything but a blank area – an empty space. Does this black rectangle mean that for Doxiadis the death of the city is identified with the death of the diagram? Is the death of the city a situation in which nothing can be recorded or analysed, a situation which science cannot approach any more? Is this black rectangle an indication of the total absence of scientific reason? One of the basic references of Otto Neurath was Ludwig Wittgenstein; a philosopher who showed how the limits of our language are an extension of the limits of our thought. Maybe we can think that through this empty diagram Doxiadis again brings Wittgenstein to the fore. It is this black square that says to us: 'Whereof one cannot speak, thereof one must be silent.'[33]

Conclusion

In his essay 'Reproduction and Negation: the Cognitive Project of *Neue Sachlichkeit*'[34] Michael Hays distinguishes two categories of modern architects: those who follow the so-called humanist tradition and those who introduce a post-humanist condition for architecture. Specifically, to support his argument, he presents the competition for the League of Nations of 1927 and analyses Le Corbusier's and Hannes Meyer's projects. Hays intends to reveal certain inconsistencies in the way modern architecture is usually theorised. Hays' effort was to discuss the alternative, 'post-humanist' practices of Hannes Meyer and Ludwig Hilberseimer, to reincorporate their stories into the history of modern architecture, and to offer them as alternative models for future architectural investigation. In other words he questions well-established theories of architecture and at the same time he proposes a reading of architecture detached from what he considers the traditional humanist view.

Assuming that the humanistic tradition is associated with a romantic-idealistic philosophy, we could propose – not necessarily following Hays' views – that Otto Neurath appears to seek to shift this paradigm. As logical positivism in general turned against the philosophical tradition by rejecting everything that could not be checked or verified logically, so does Neurath when he directs his attack against the type of architect who – although he is self-introduced as an offspring of the modern era – still works in fact like a nineteenth-century artist-creator who only trusts his talent and inspiration, and not as a contemporary scientist who follows an accurate and lucid methodology.

It is interesting to note also that even if Neurath participated in the Fourth CIAM as an important guest – as a scientist who could offer new tools to the architects and urbanists of the time – he and his theories were soon deliberately pushed aside by the main CIAM members. As we read in a letter addressed by van Eesteren to Moholy-Nagy a few weeks after the 1933 congress:

> *I am truly happy that you participated in the congress* [...] *In particular, what has stayed in my mind is how intensely you debated Neurath – in which you, very correctly, always integrated the psychological and the human into the discussion; had you not, we would have definitely fallen victim to Neurath's rather limited system.*[35]

According to van Eesteren, Neurath's rigid graphic analysis does undermine the 'psychological and human factor'. It seems that the Dutch recognises standardisation as a problem the moment

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standardisation negates the significance of the subjective-psychological dimension, a dimension which Neurath bypasses in order to deal with what is generic, typical and common.

Although we cannot know exactly what van Eesteren's letter suggests, we can assume that when talking about psychology he tries to set aside Neurath's pragmatist reason by advancing a factor which is not measurable, nor obeys any objective rules and criteria. But if this is the case then how can one take into account this 'psychological-human factor'? How can an architect or planner integrate in his designs something so vague and undefined? These are questions that perhaps Neurath himself would have asked, understanding that he has to confront a radically opposite theoretical approach. For the Austrian philosopher, whenever factors which cannot be checked and verified are introduced in design, then its scientificity is undermined and its effectiveness is disputed.

Therefore the rejection of Neurath's ideas by the main CIAM members is justified to the extent that what is rejected in the end is Neurath's positivist approach against modern architecture's artistic (that is metaphysical) context. In such a climate Otto Neurath could only appear as a stranger – actually and metaphorically – as a distant and unknown person. It is true that for the protagonists of the fourth CIAM, such as Le Corbusier, Giedion and van Eesteren, Neurath's ideology was reviving a traumatic debate they wanted to overcome: the debate with the radical left-wing of CIAM, which led to the geographical shift of the 1933 congress from Moscow to Athens.[36] The debate between a group who wanted to put aside political disputes turning towards a more symbolical and less functionalist modern architecture and another group who consciously adopting a socialist ideology had economy, functionality and standardisation as its top priorities.[37] And it became apparent that the leading role of Le Corbusier as well as the strong presence of the CIAM general secretary, Sigfried Giedion – who as an art historian himself considered modern architecture as another art – were two of the decisive factors that not only led to the prevalence of the first team but subsequently formed the identity of what was, ex post facto, defined as modern architecture in general.

Through their visual language these ISOTYPE diagrams, from Neurath to Doxiadis, talk to us about one of the multiple facets of Modernism; the facet which mirrored an effort to override architecture's artistic and metaphysical background. An effort made to establish architecture among the human sciences – a science that is as direct, clear and transparent as possible.

Notes

1. Otto Neurath, 'L'Urbanisme et Le Lotissement du Sol en Representation Optique d'après la Methode Viennoise', *Technika Chronika* (15 October – 15 November 1933), pp. 1036–40.
2. Ibid., p. 1078.
3. Ibid., p. 1079.
4. Ibid., p. 1040.
5. Ibid.
6. Ibid., p. 1036.
7. Ibid.
8. Ernst Neufert, *Bauentwurfslehre* (Berlin: Bauwelt-verlag, 1936).
9. Otto Neurath, *Gesellschaft und Wirtschaft. Bildstatistisches Elementarwerk. Das Gesellschafts- und Wirtschaftsmuseum in Wien zeigt in 100 farbigen Bildtafeln Produktionsformen, Gesellschaftsordnungen, Kulturstufen, Lebenshaltungen* (Leipzig: Bibliographisches Institut, 1930).
10. See Nader Vossoughian, *Otto Neurath, The Language of the Global Polis* (Rotterdam: NAi publishers, 2008), p. 129.
11. Ibid.
12. Athens, Doxiadis Archives, Ref Code: 23915.
13. Dimitris Moretis, 'Report to the Executive Committee of the War Exhibition' (21 August 1945). Athens, Doxiadis Archives, Ref Code: 22872.
14. Ibid.
15. Ibid.
16. Constantinos Doxiadis, *Ai Thysiai tis Ellados ston Deftero Pagkosmio Polemo* (Athens: Ministry of Reconstruction, 1946).
17. At this time Neurath had published two of his papers in the US: 'World Planning and the U.S.A.', *The Survey Graphic* (March 1932), pp. 621–28 and 'Museums of the Future', *The Survey Graphic* (September 1933) pp. 458-63, 479, 486.
18. Rudolf Modley, *A History of the War in Maps, Pictographs, in Words* (London: Penguin, 1943).
19. Rudolf Modley, *How to Use Pictorial Statistics* (New York: Harper and Brothers, 1937).
20. J. L. Sert, *Can our Cities Survive?* (Cambridge, MA: Harvard University Press, 1942).
21. Considering Sert's book and CIAM see Eric Mumford, *The CIAM Discourse on Urbanism, 1928–1960* (Cambridge, MA: MIT Press, 2000), pp. 131–43.
22. We are talking about Viktoras Vafeiadis, Prokopis Vasileiadis, Arthuros Skepers and Yannis Papaioannou. The relevant correspondence was found in Doxiadis Archives, ref code: 23127.
23. C. Doxiadis, *Architecture in Transition* (London: Hutchinson, 1962). Reprinted in A. Kyrtsis (ed.), *Constantinos Doxiadis: Texts, Design Drawings, Settlements* (Athens: Ikaros, 2006), p. 237.
24. From Doxiadis's lecture in the 1963 UIA Congress (Mexico). Reprinted in A. Kyrtsis, op cit., p. 255.
25. Le Corbusier *Urbanisme* (Paris: Flammarion, 1994 [1925]), p. 114f.
26. Ibid., p. 100.
27. Ibid.
28. Constantinos Doxiadis, 'Anthropocosmos' <http://www.doxiadis.org/files/pdf/Anthropocosmos.%20The%20World%20of%20Man%20_me%20logo_.pdf> [Accessed: 15 November 2010].
29. Ibid., p. 111.
30. I am referring to the acronym IDEA which for Doxiadis is: Isolation of Dimensions and Elimination of Alternatives.
31. The term firstly appeared in a lecture entitled 'Ecumenopolis: Toward the Universal City' that Doxiadis prepared for the 28th National Conference of the *National Association of Housing and Redevelopment Officials* (NAHRO) in Washington, D.C., 29 October – 1 November 1961 (Doxiadis Archives, Ref Code: 2591). See also C. A. Doxiadis and J. G. Papaioannou *Ecumenopolis: The Inevitable City of the Future* (New York: Norton, 1975). This is a book where the findings of the 'The City of the Future' (COF) research project, which has been conducted by the Athens Center of Ekistics (ACE) since 1960, are collected and presented.
32. This diagram is presented in C.

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Doxiadis, 'The Two-headed Eagle (From the Past to the Future of Human Settlements)', *Ekistics*, 33, (1972), 198 (pp. 406–20).
33. ' Wovon man nicht sprechen kann, darüber muss man schweigen.' The well known proposition 7 from Wittgestein's *Tractatus Logico Philosophicus*.
34. In Michael Hays, *Modernism and the Post-Humanist Subject: The Architecture of Hannes Meyer and Ludwig Hilberseimer* (Cambridge, MA: MIT Press, 1992), pp. 149–84.
35. Quoted in Vossoughian, op. cit., p. 129.
36. See Eric Mumford, *The CIAM Discourse...*, op. cit. pp. 73–75.
37. Considering the known debate between the two 'wings' of the CIAM in general see Eric Mumford's 'CIAM and the Communist Bloc, 1928–59', *The Journal of Architecture*, 14, (2009), 2, (pp. 237–55).

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Technical Chamber of Greece library, 1–3

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