

MAPPING MOVEMENT

How To Design Iconic Transit Maps



MARK OVENDEN

Author of the bestselling book 'Transit Maps of the World'

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CONTENTS

INTRODUCTION by Lance Wyman

4

BRIEF HISTORY OF TRANSIT MAPPING

From 1863, Mark Ovenden explains how cartography has evolved and how the book works.

5

MAPMAKERS: THE PANEL

Cameron Booth introduces the transit map designers who helped in the selection of maps in this book

8

BEST TRANSIT DESIGN PRACTICE

The panel summarize tips and hurdles for designers

10

HOW MAPS ARE EVALUATED

Professor Maxwell Roberts on empirical evidence

12

AN INTERNATIONAL STANDARD?

Jug Cerovic argues in favour of standardisation

16

ICONIC MAPS BY CONTINENT

Shown in alphabetical order (see facing page)

18

CHARTS

The 'best of' lists from the judges panel

174

FLATTERY & IMITATION

World's best transit iconography inspired design

176

INDEX

180

BIBLIOGRAPHY

And recommended media

183

ACKNOWLEDGEMENTS/CREDITS

Plus links to websites

184

ICONIC MAPS BY CONTINENT

Listed in alphabetical order by continent, the inclusion of these cities (or the exclusion of any others) is not a comment on the importance of the city, or its transport system, merely that these have stories to tell in transit map design.



AFRICA

Algiers
Cairo

20
21

AMERICA'S

Boston
Buenos Aires
Chicago
Los Angeles
Mexico City
Montreal
New York City
San Francisco
Santiago
Sao Paulo
Washington D.C.

24
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ASIA

Bangkok
Beijing
Delhi
Hong Kong
Osaka
Seoul
Shanghai
Singapore
Tokyo

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70
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EUROPE

Amsterdam
Barcelona
Berlin
Brussels
Budapest
Hamburg

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92
96
102
103
104

Kyiv
Lisbon
London
Lyon
Madrid
Milan
Munich
Moscow
Paris
Prague
Saint Petersburg
Stockholm
Vienna

OCEANIA

Melbourne
Sydney

170

172

"The creative part of design is an enriching collaboration"

Beatrice Cifuentes, Waterhouse Cifuentes Design





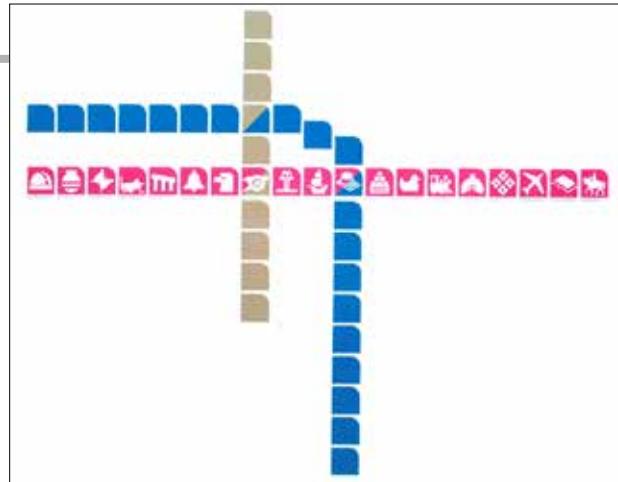
Top left & bottom right
Lance Wyman in his studio surrounded by some of his work.

Top right
Initial concept for Mexico City Metro diagram, 1967.

Bottom left
Sketches from Lance's notebook for the Washington DC map, 1974.

INTRODUCTION

Lance Wyman is one of the world's greatest living designers whose work has spanned five decades. One of his earliest major roles was the creation of a logo, typeface and map for the embryonic Mexico City Metro which opened in 1968. He explains why an open mind, a keen eye and a bit of luck are crucial for every cartographer.



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TRANSIT MAPS IN A NUTSHELL

Author **Mark Ovenden** gives a brief history of how good design came to be so key to navigating complex transit systems, begining with a tale of his own.



Once upon a time, a seven year old boy navigated his way alone across a big city, with nothing more than a map of the transit system. I would probably have got lost had it not been for the wise thinking of a designer fifty years earlier who realised that complex networks could be made more comprehensible by simplifying how they are depicted so that even a child can work out how to get around. But in the 1960s not all operators had embraced that lesson and as I began collecting transit maps from around the world it became obvious that some cities had bowed to the sense of good designers more than others.

This book celebrates how standing on the shoulders of design giants, way finding can be made easier. But when subterranean railways were new concepts, helping passengers navigate them was not high on their agenda.

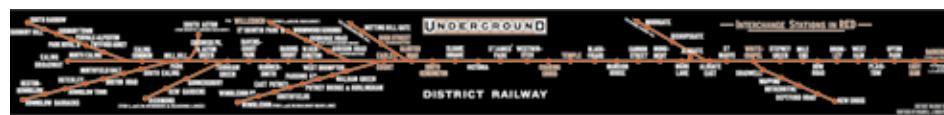
Birth of mass rapid transit

While the nineteenth Century surface railways were competing for passengers by copious uses of posters, maps and guides, the early underground lines did little to publicise their routes. Those mass transit pioneers in London, New York, Boston, Paris

Top left
Detail from 1898 Boston Elevated map - although the routes were at least coloured, overprinting them on a standard geographic map did not make for the greatest legibility.

Top right
Mark Ovenden beside a London Tube train in the city's museum.

Centre right
1908 in-car strip map for London's District Railway was one of the earliest uses of a schematic (2018 digitisation by Max Roberts).



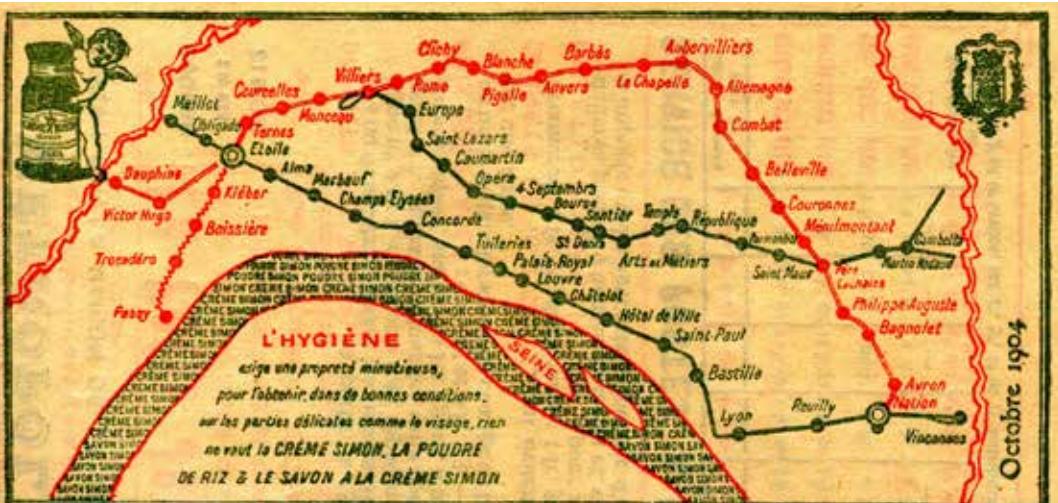
and Berlin...eventually started promoting themselves around the dawn of the twentieth century but using only methods did not do the trick.

Clutter needed clearing

One of the earliest known examples of depicting a network without any clutter was from Paris in 1904, and although some streets were shown, also from New York in the same year. Individual lines shown

Bottom left
Clear 1904 diagram of the three existing Paris Metro lines.

Bottom right
Detail from 1931 S-Bahn diagram of Berlin which arguably was one of the first to use geometric schematics for an entire network.





MAPMAKERS

Given there are now so many transit systems there had to be a process to whittle down the ones that are featured in this book. The design panel who made the selection here is made up of both professional cartographers (those who are employed to draw their cities' map) and enthusiasts who between them have designed or commentated on hundreds of alternate transit maps.



*Far left and near left*

The panel looked at both digital and hard printed paper copies of all systems available, both old and new.

Facing bottom

Some of the designers on the judging panel, with their names overlaid on a diagram unashamedly based on the Kyiv Metro map.



RICHARD ARCHAMBAULT

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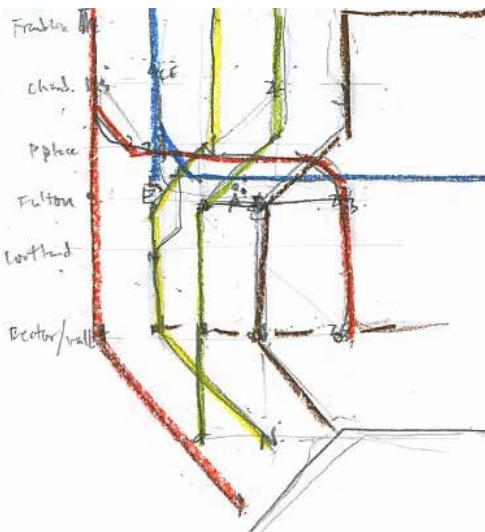
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BEST DESIGN PRACTICE

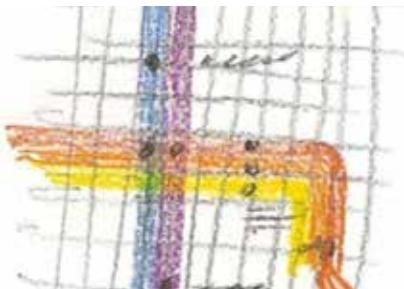
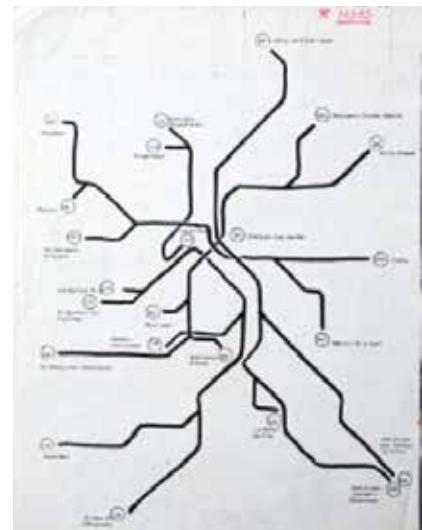
Jug Cerovic, Beatrice Cifuentes and Cameron Booth summarise the key points for the best practice in transit map design, as discussed at the Transit Map symposium in Madrid, October 2022.



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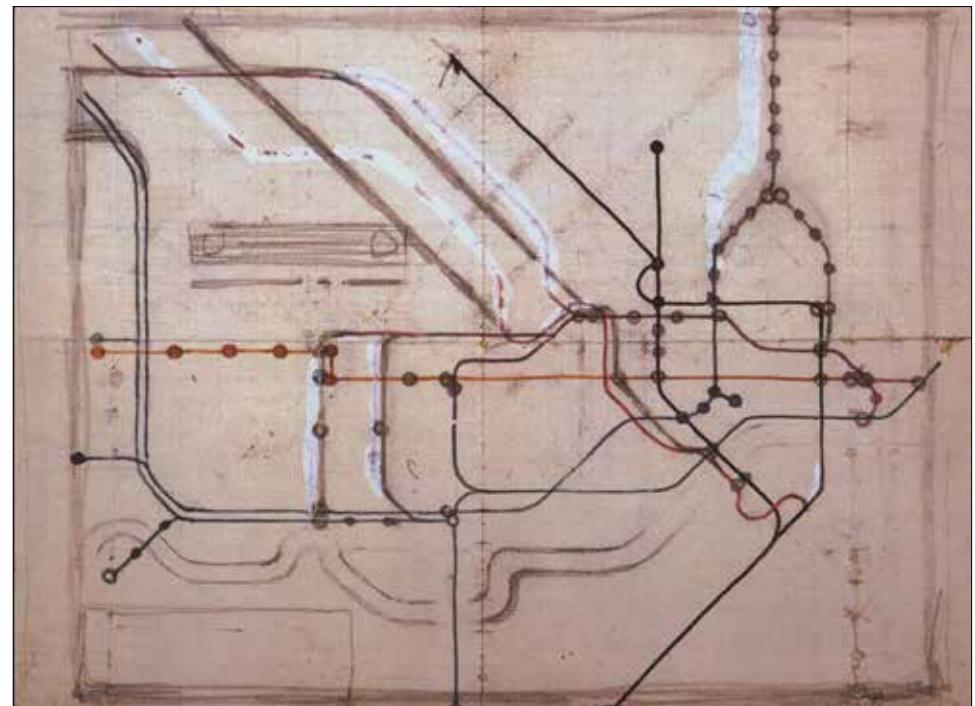
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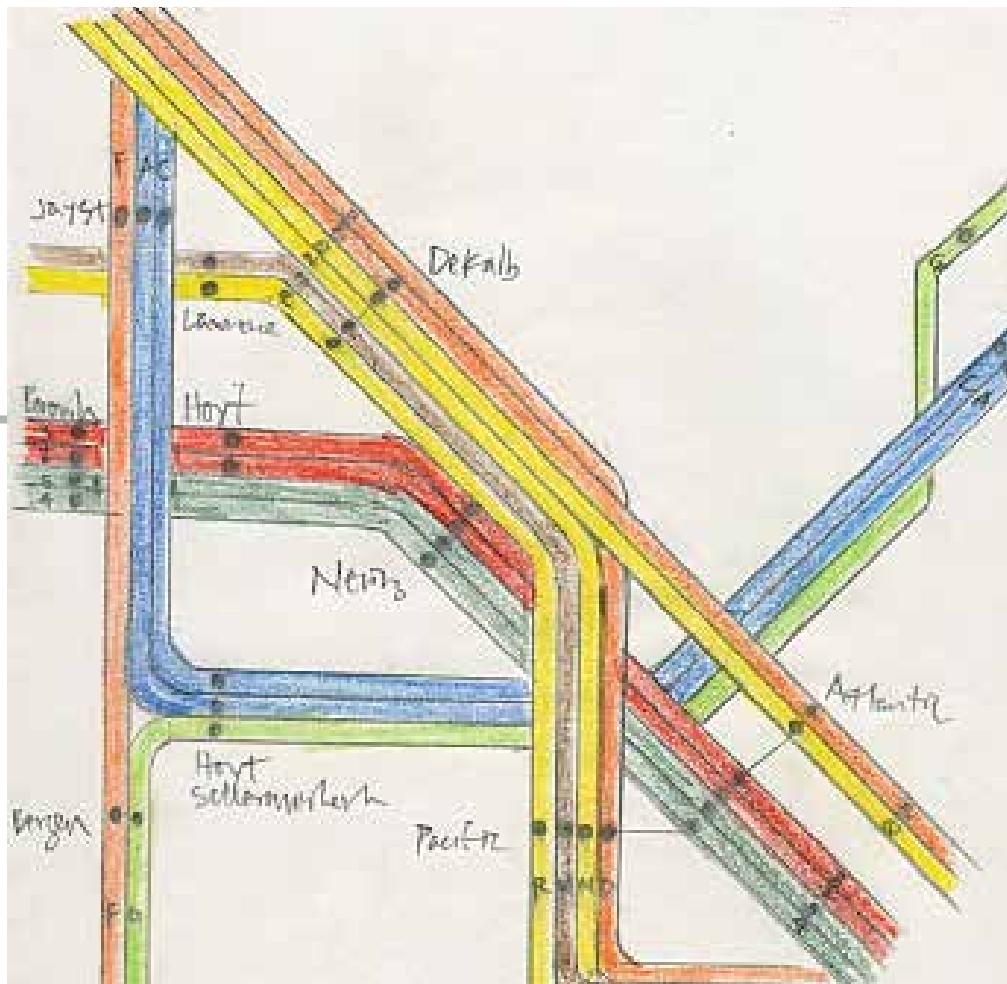
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EVALUATING DESIGN

It's all very well having a nice idea on a computer screen - but Professor Maxwell Roberts examines empirical evidence on how designs perform.

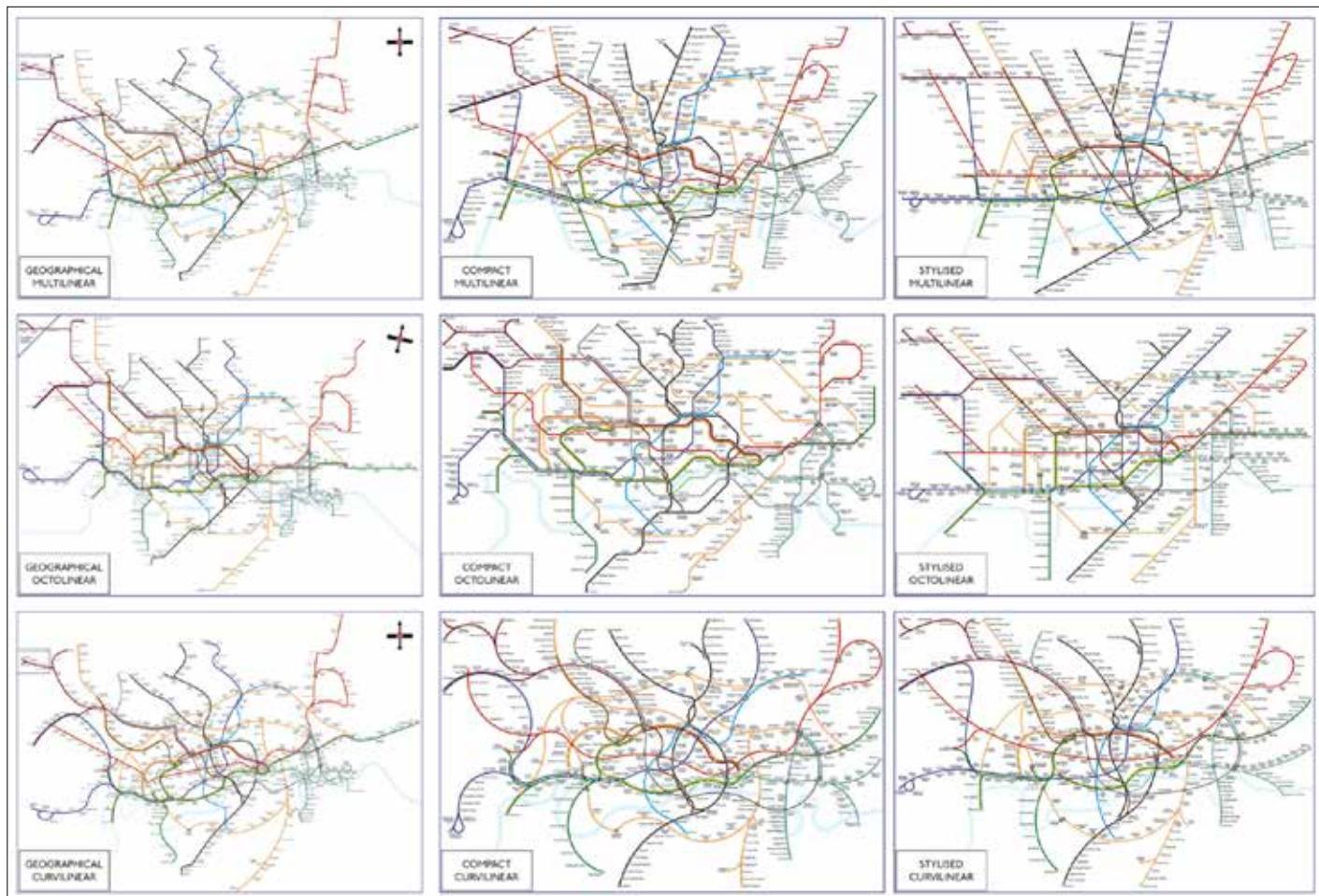


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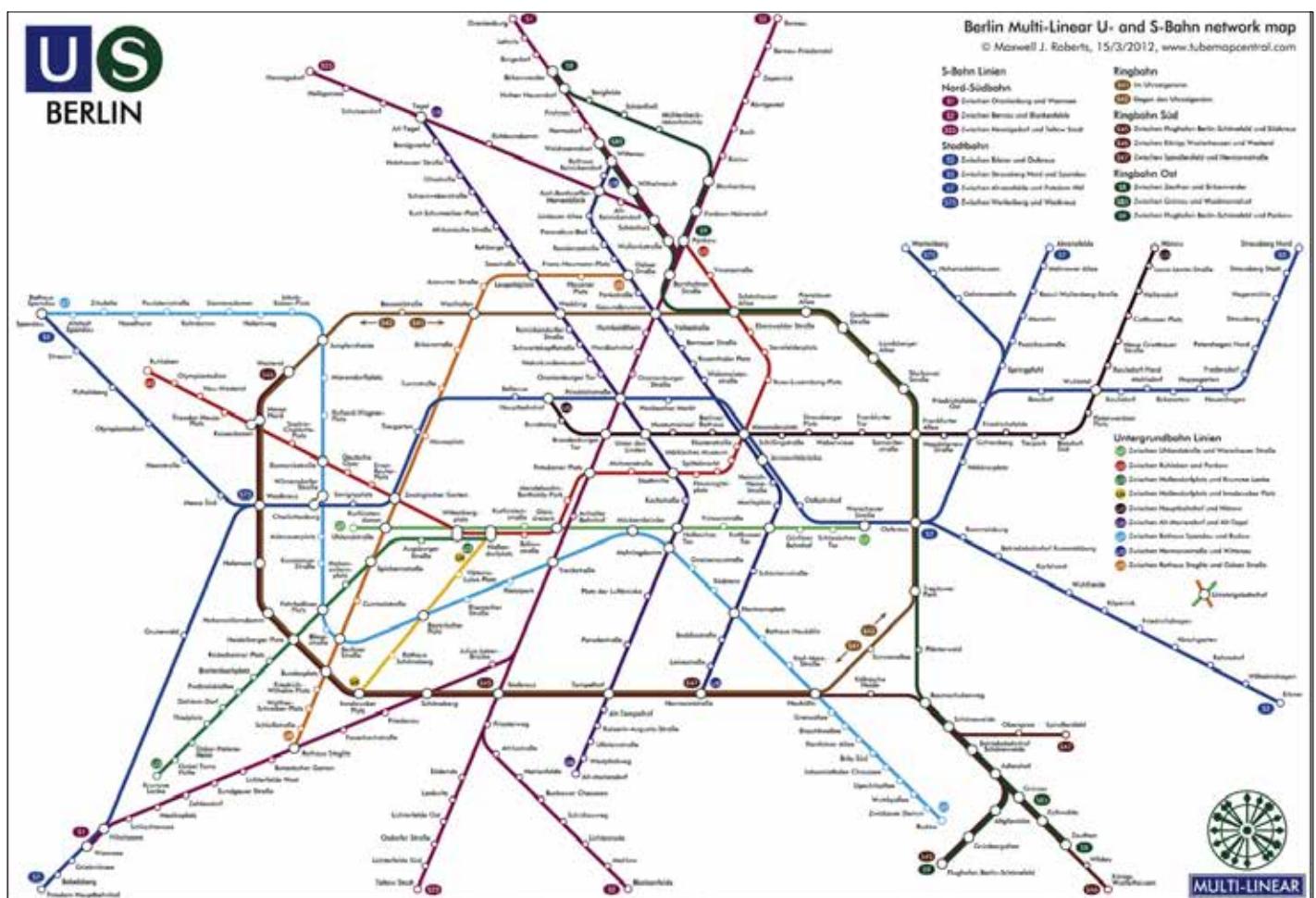
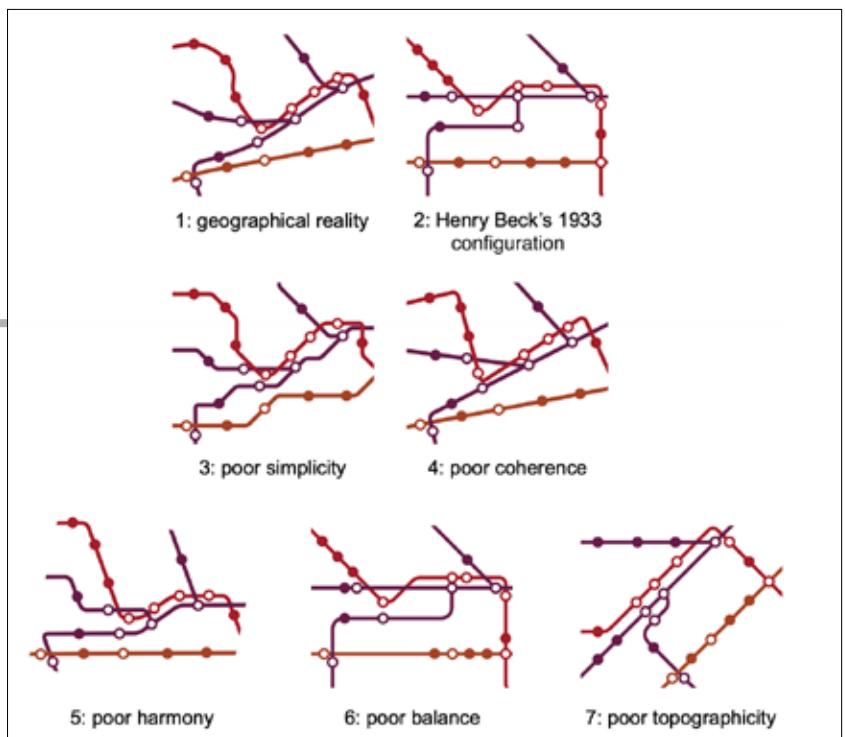
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AN INTERNATIONAL STANDARD

Would it not be easier for passengers if all transit maps conformed to an internationally agreed standard? Jug Cerovic has already designed one: his INAT system displays conformity and comfort for travellers and he argues here and in his book: *One Metro World* that city individuality and diversity can easily be retained.



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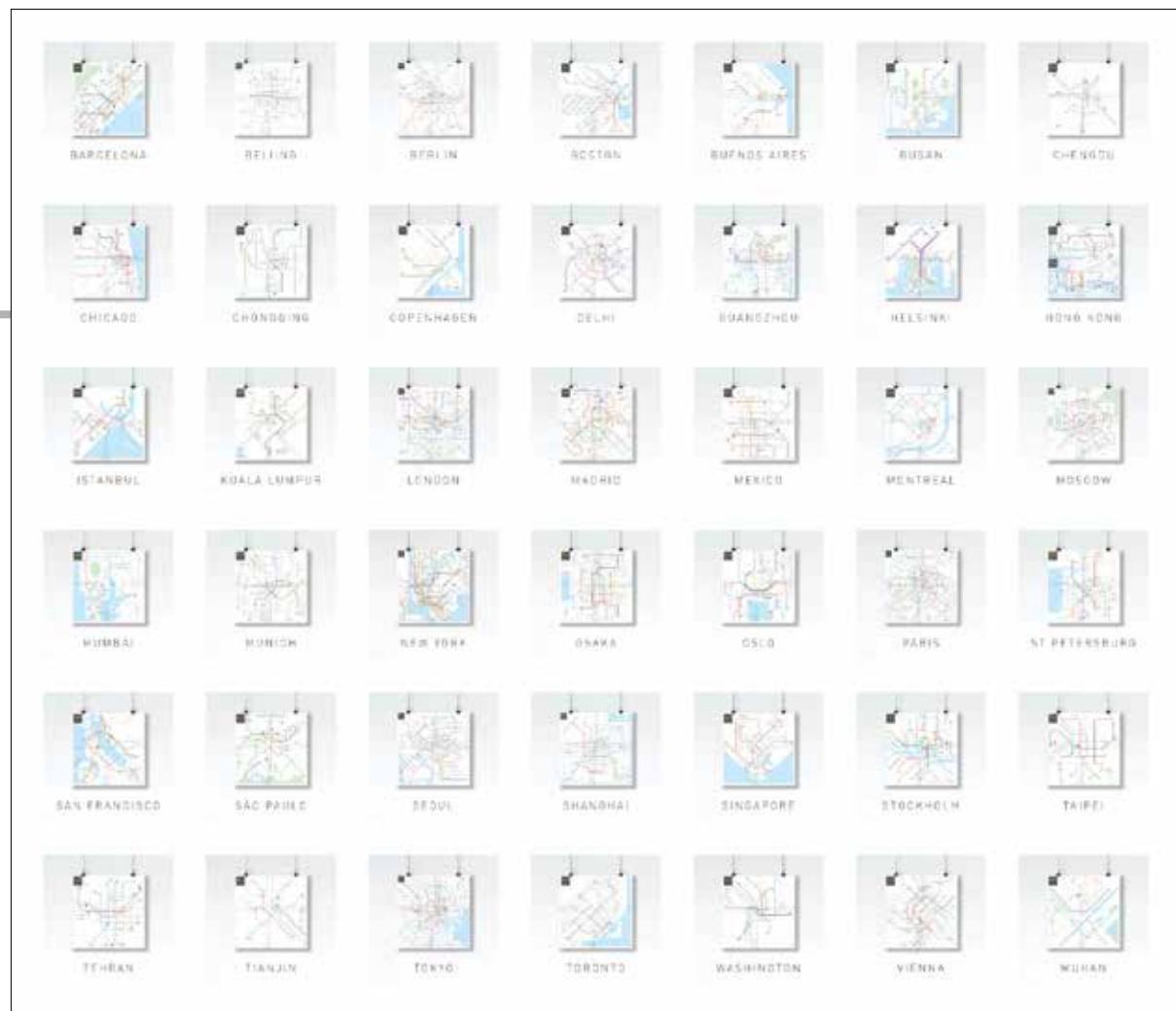
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LINE TYPE	Metro	Commuter Rail	Light Rail	Bus Rapid Transit (BRT)	Tramway	Bus	Ferry	Cable Car
TRANSFER STATION	Regular transfer	Transfer between stations with different names	Long walk transfer		Out of system transfer			
STATION NAME	Regular Station	Terrinal Station						
COLORS	Châtelet	CHÂTELET						
ICONS	Airport	Railway Station	Bus Terminal	Maritime Terminal	Landscape	Town	Water	Shore

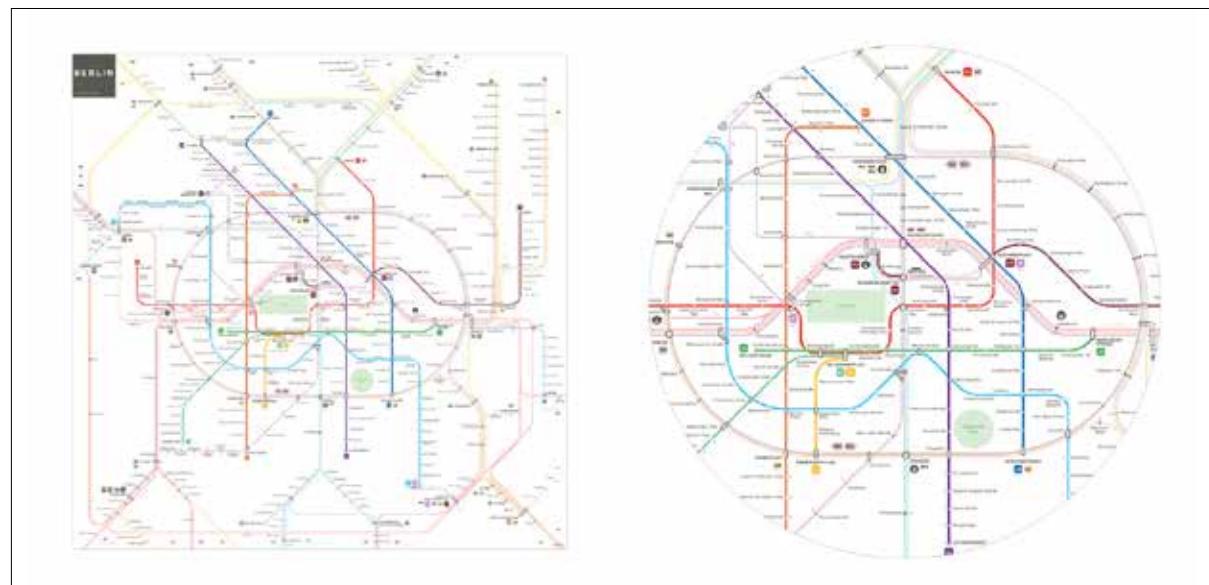
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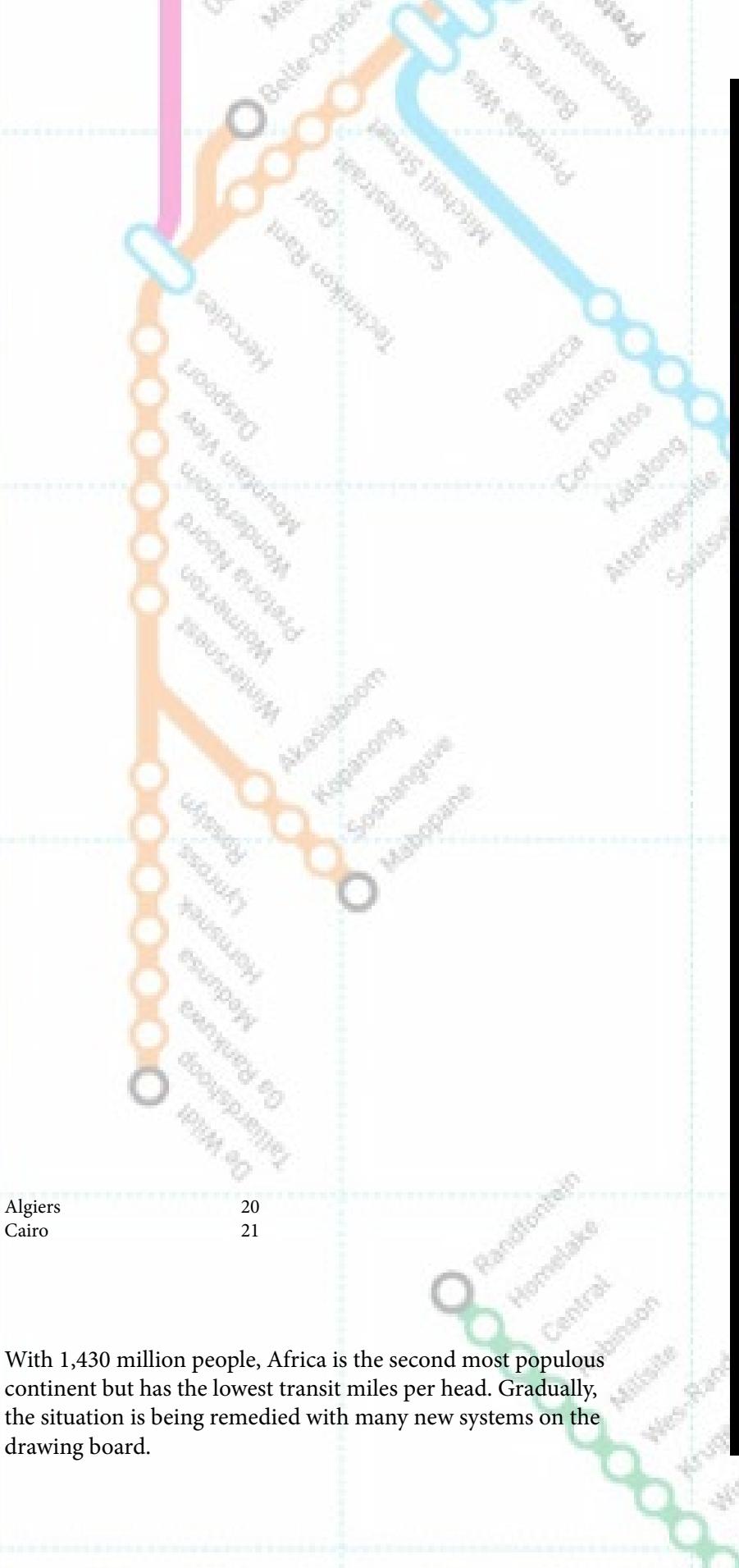
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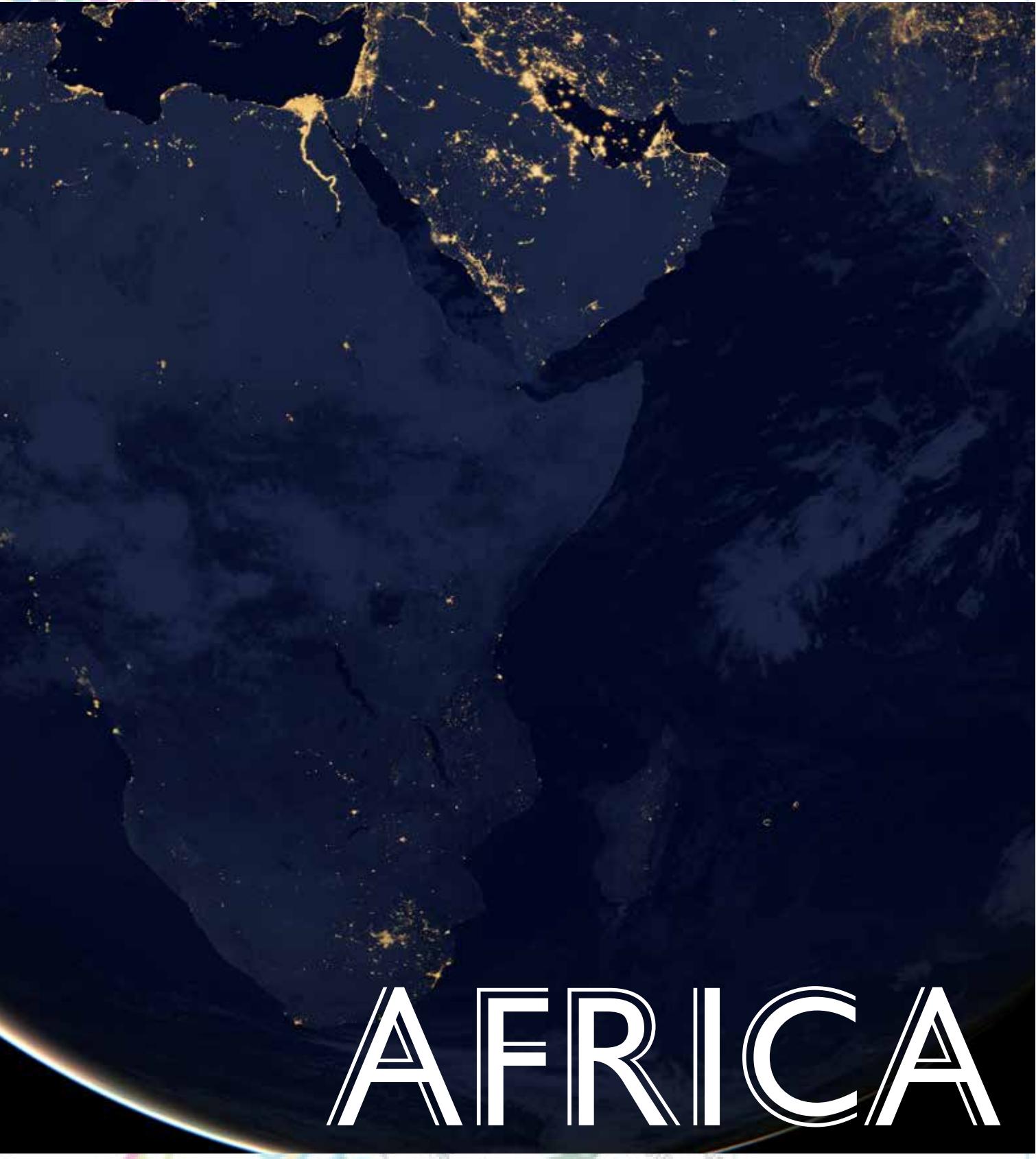
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With 1,430 million people, Africa is the second most populous continent but has the lowest transit miles per head. Gradually, the situation is being remedied with many new systems on the drawing board.

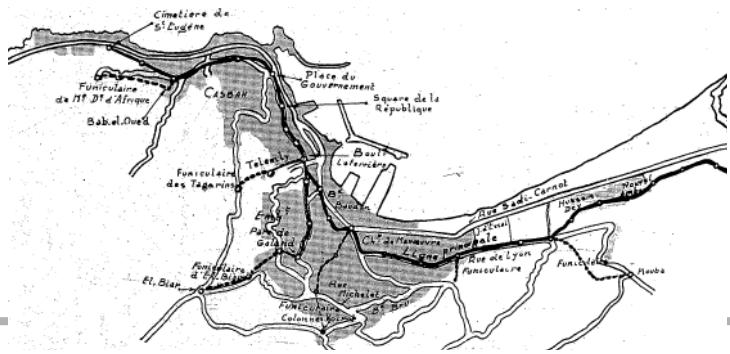
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AFRICA

ALGIERS

Proposals for a transit system in the Algerian capital date back to the 1930s, and construction work began in 1980 but it suffered so many delays that the first line of metro was not opened until 2011.

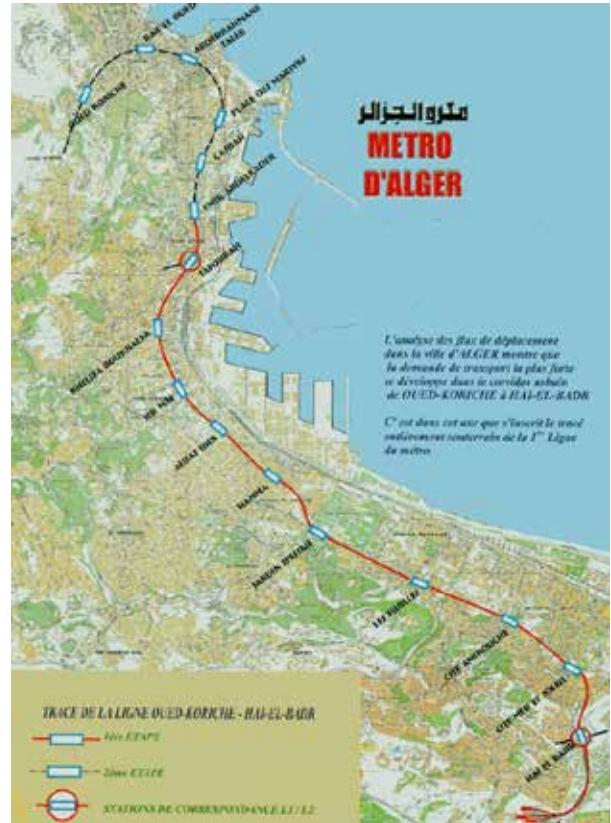


Top right
Newspaper
sketch of 1933
proposal.

Above
Ticket map.

Centre right
Official 2010
geographic map.

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Top left
Official diagram 2018.

Top right
2019 platform map

Below
2021 map of all Algiers rail based transport.

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"Better design is in our soul"
Menad Kherfi, Directeur d'Exploitation Metro d'Algier



CAIRO

Despite being the first metro system on the African continent, the Cairo operator produced little officially to show the system route. In the 2020s this changed with the adoption of a traditional clear diagram produced by RATP Dev Mobility Cairo (RDMC) for the opening of Line 3 which it now runs on behalf of the city.

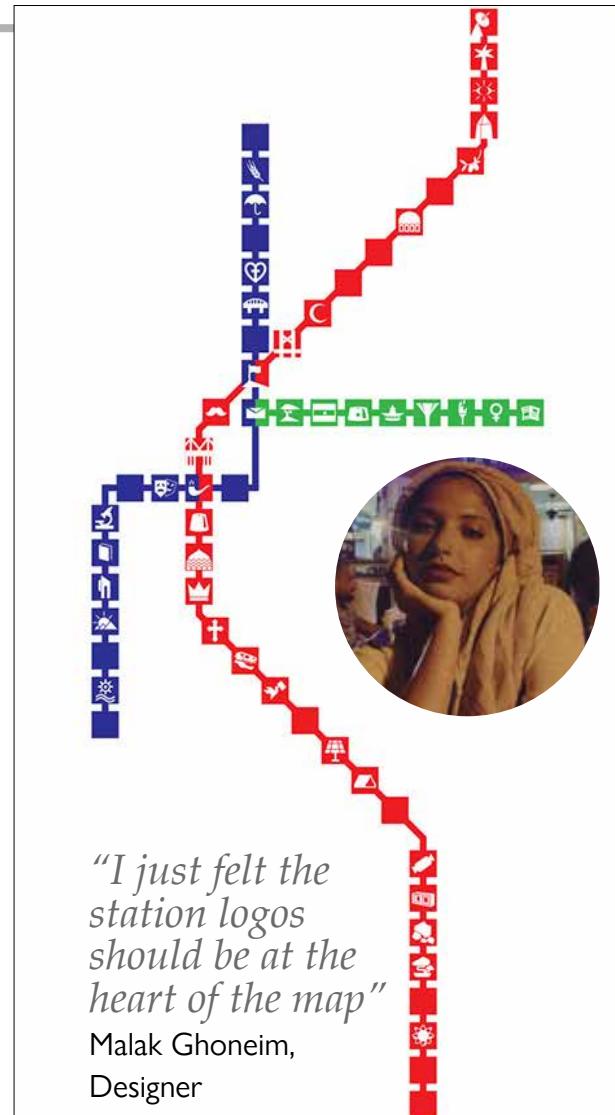
Top
The original system logo incorporating a star of David.

Bottom left
Official 2000s wall map on Nasser station platform.

Centre right
revised map proposal from student Malak Ghoneim (inset) incorporating the station logo style pioneered by Wyman.

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Right
Märwa Alatabany the Operational Line Services manager implemented in car map placements.

Below
Issued in June 2022 by RDMC, this hybrid diagram sites the three existing Metro lines within a stylised geographical framework.

Lopsem Ipsum
Tionem ullam corporis suscipit laboriosam,

"It needs to be legible at speed"

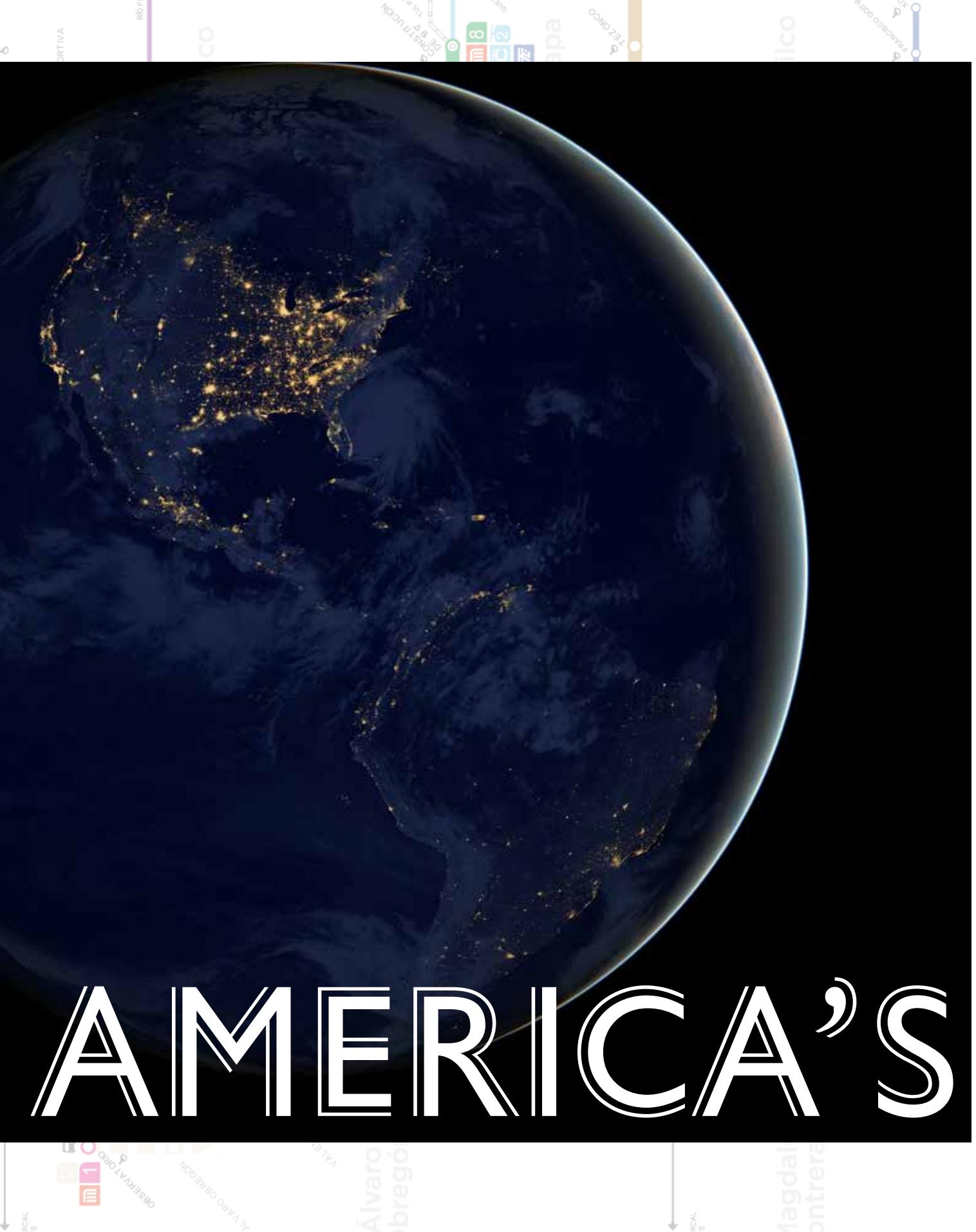
Marwa Alatabany, RDMC





Boston
Buenos Aires
Chicago
Los Angeles
Mexico City
Montreal
New York City
San Francisco
Santiago
Sao Paulo
Washington D.C.

With a population of over 1,022 million and 40 transit systems (over 70 if light rail and streetcars are counted), the joint continents of North and South America make up for their under-supply of transit per head of population with impressive ideas for transit map designs.



AMERICA'S



Top and opposite top, left and right
Graphic redesign by Ronald Shakespear.

Bottom left
1955 system map

Bottom right and opposite bottom
Modern schematics in current use.

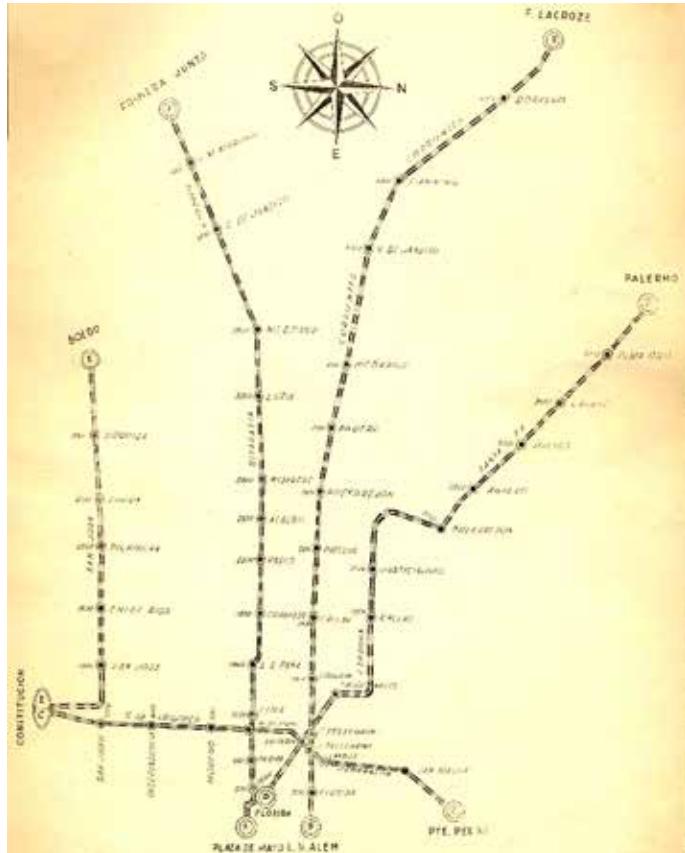
BUENOS AIRES

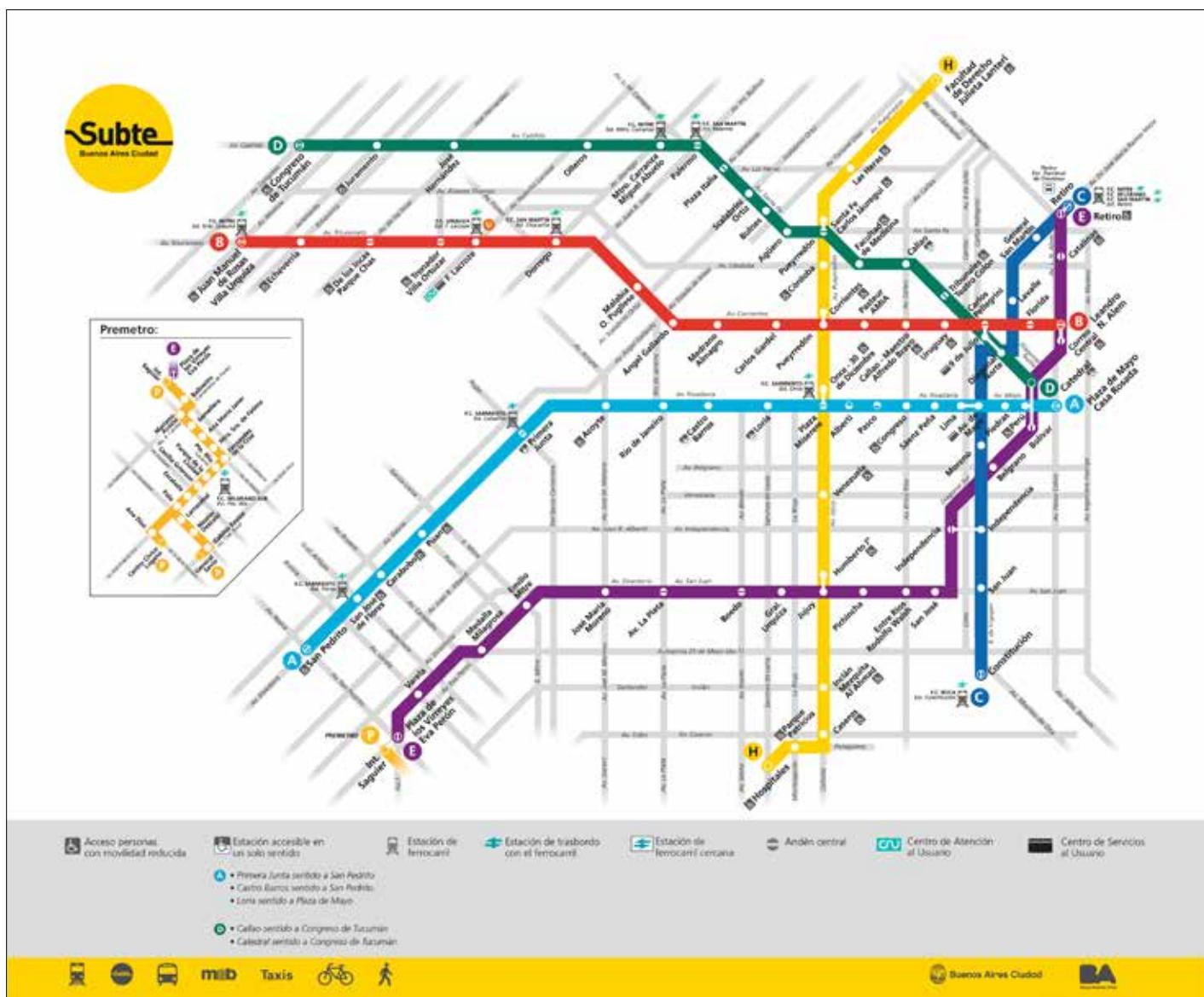
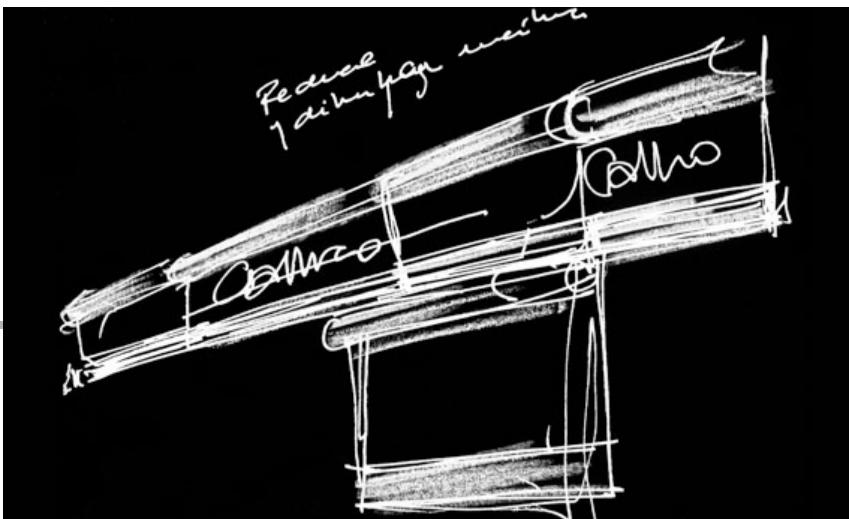
The first rapid transit system in South America opened in 1913 and was extended in the 1930s and was revitalised in the 1990s by the Shakespear design agency.



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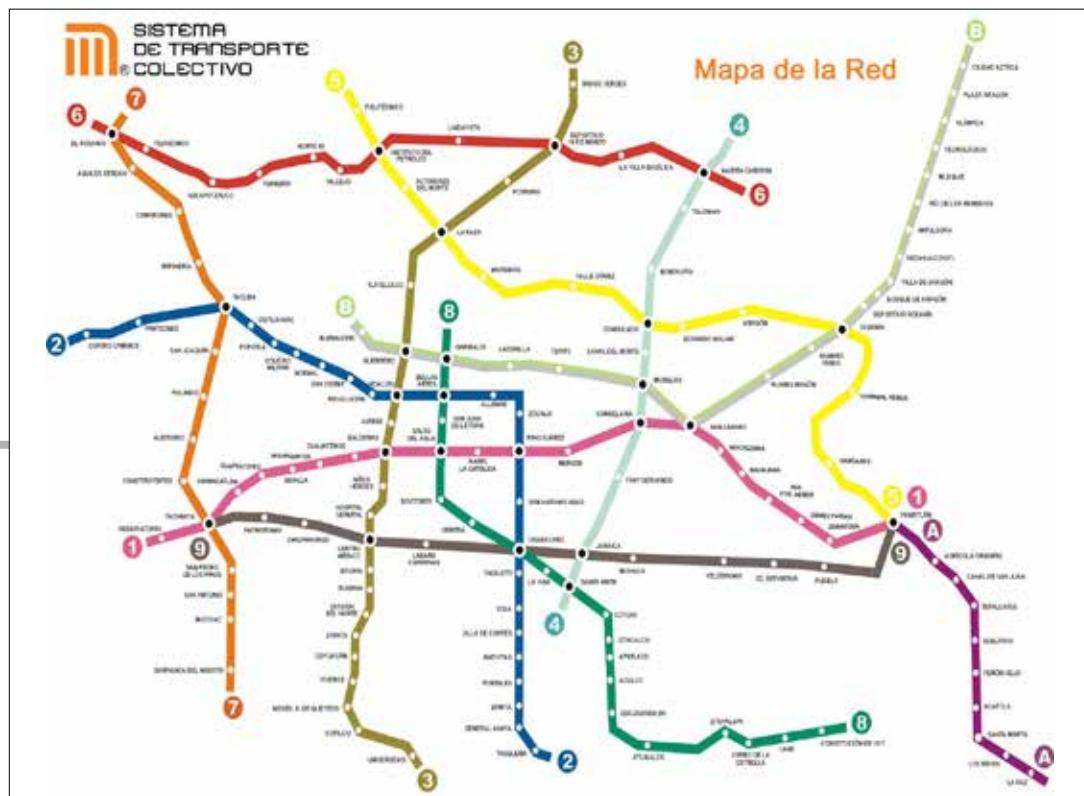
MEXICO CITY

Now the busiest transport system in the Americas, the Mexico City Metro only began life in 1968, just in time for the opening of the summer Olympic Games. From the outset high standards of design were at its heart but while these had lapsed there is now a return to earlier qualities.



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Above, opposite left centre & bottom Wyman (inset) original station logos in use on 1960s diagrams.

Opposite bottom right
Early 2000s official fold out topologic map showing streets.

Top left
2003 official diagram makes no effort to smooth out kinks.

Centre left
1990s in car strip map using logos.

Bottom right
Archambault's unofficial proposal to include station logos.

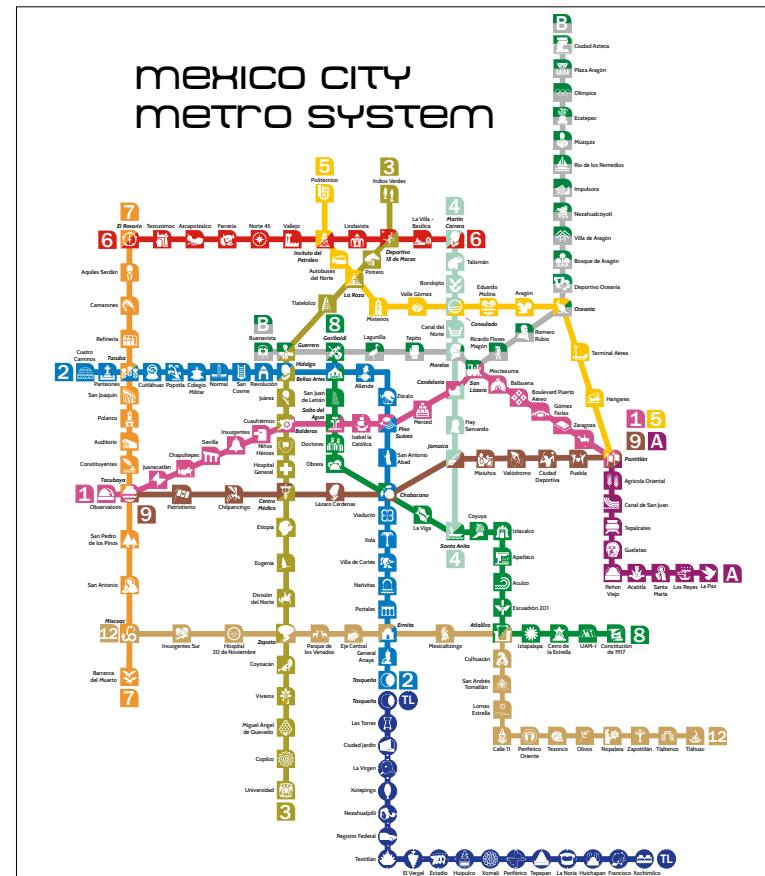


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MEXICO CITY

ROUTE TO SCHEMATICS

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Top left
Pedro Avila

Middle left
Station wall diagram photographed in 2012 by Archambault some system schematics in use.

Bottom left and right
Passengers are confused by the official geographic map.

Opposite
Avila's work was adopted by the city region showing all networks.

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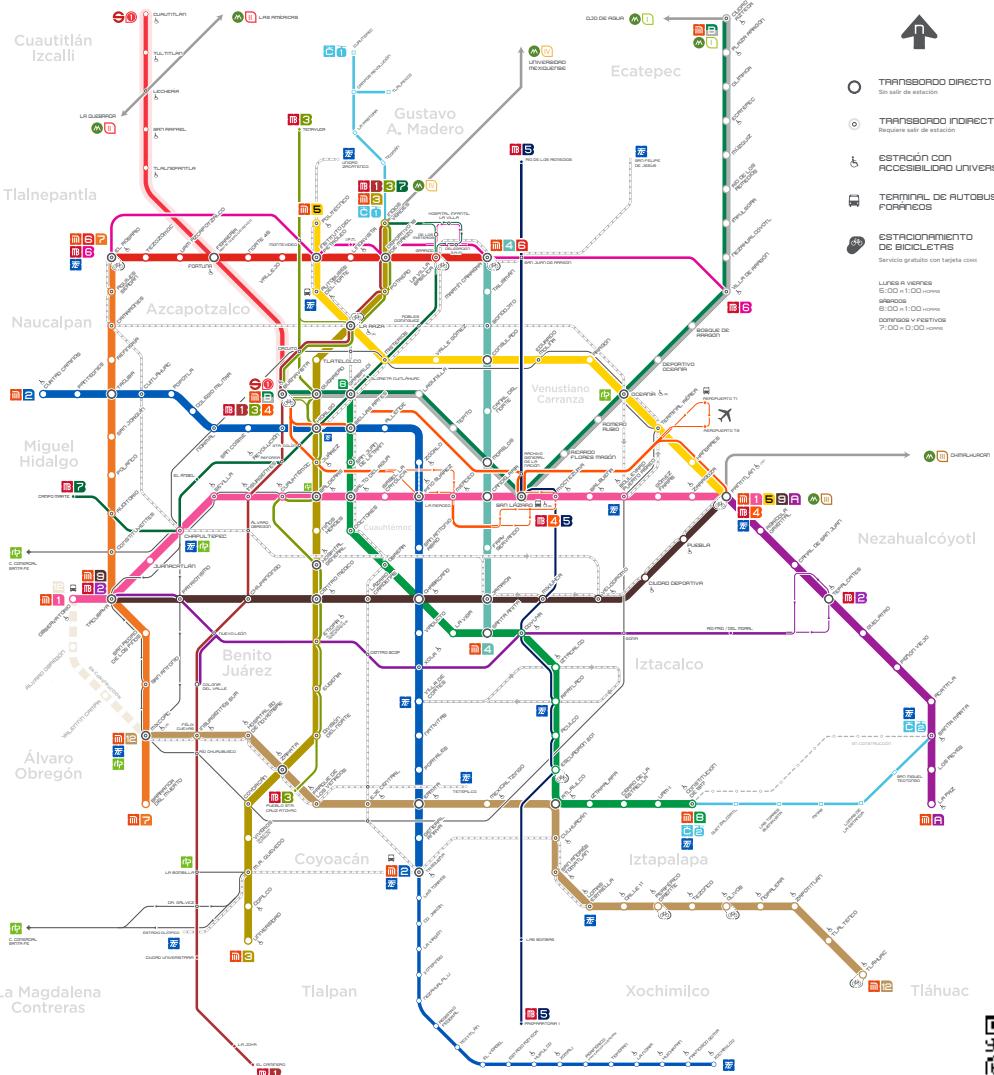
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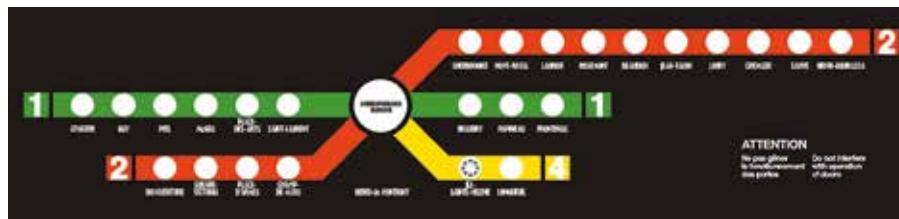
MOVILIDAD INTEGRADA DE LA CIUDAD DE MÉXICO

UNA CIUDAD, UN SISTEMA



Montreal

Canada's second rapid transit system was prepared for the run up to the 1967 Exposition, although its aspirations for building a system went back to the 1940s.



Top

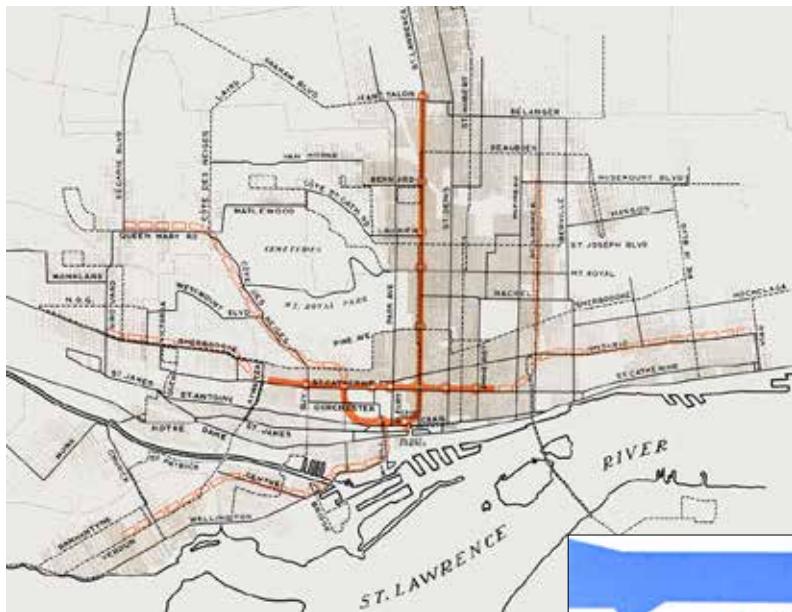
This 1960s mock up of a line plan was designed to show how the full network would be distorted to fit carriage maps.

Right

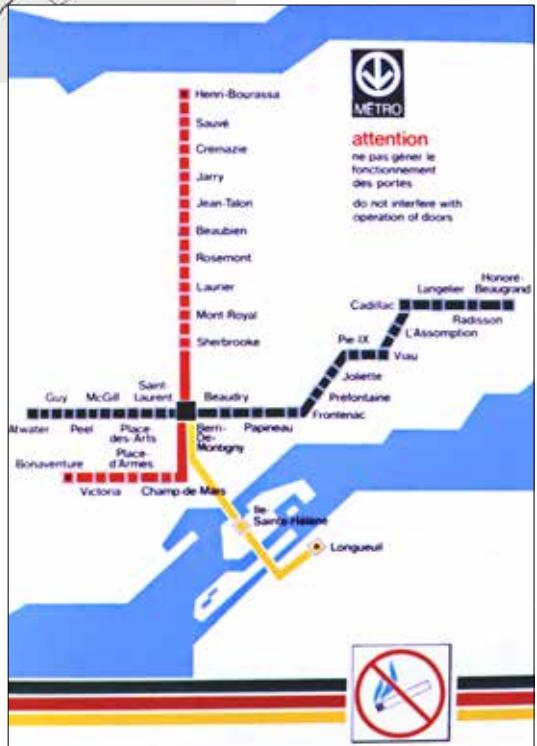
The 1940s plan for a metro did not come to fruition at that time.

Below

Early line diagram on a Line 2 platform by Jacques Gillion (inset).



Above
Montreal Mayor Jean Drapeau was a stickler for planning and good design from the outset.





Métro

Right
 The 1960s concept map (opposite top) was one of the worlds first to utilise a dark background. This idea was revived for the nework diagram in the 1990s by designer xxxx. The most recent example (2022) produced by STM retains this concept.

Opposite, Bottom right
 Sue Gould's 1972 network map.

Below
 1970s Metro designer Sue Gould.



"Maps are integral to transit branding"

Sue Gould,
 President,
 Lebowitz
 Gould Design



**Top left**

Station interiors were difficult to make beautiful but a glance to the ceiling shows efforts were made in 1904.

Bottom

1881 map of street and elevated railways begins the trait of altering the angle of Manhattan to suit the unknown cartographer.

Opposite, bottom left
1939 BMT system map
designed by George V.
Plachy.

NEW YORK CITY

Once the World's biggest transit system the New York City Subway is still the United States largest and most used. Opened in 1904 after decades of wrangling, the first line featured platform architecture to rival any other subterranean system so far begun, but how did it's mapping keep pace with development and why has it become iconic?

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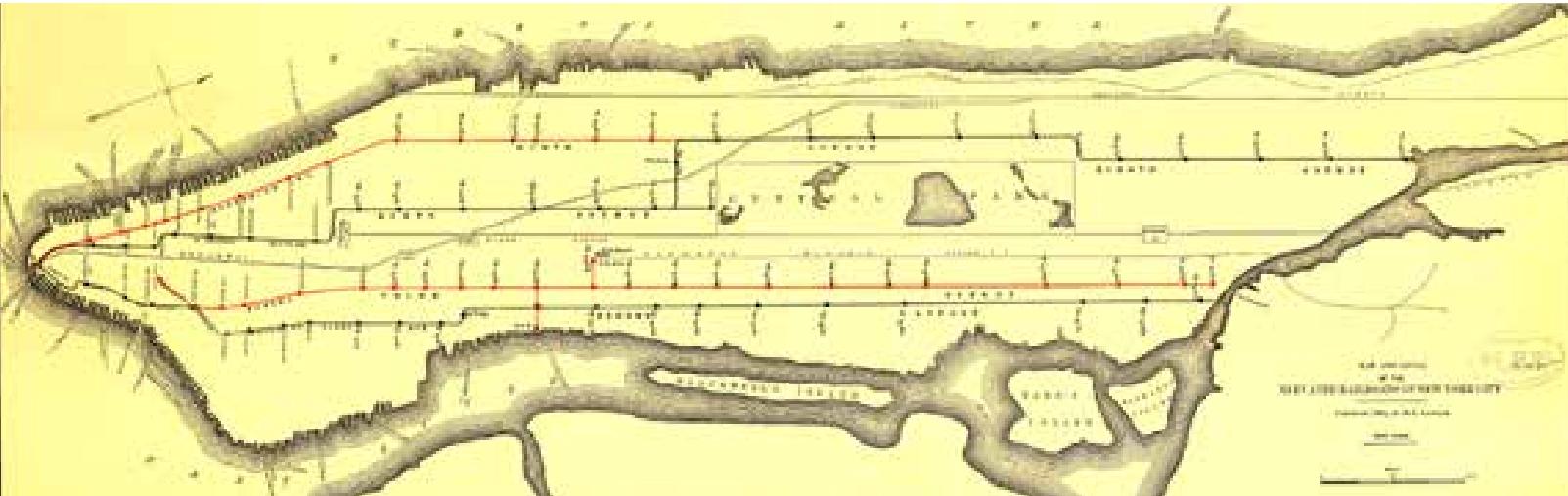
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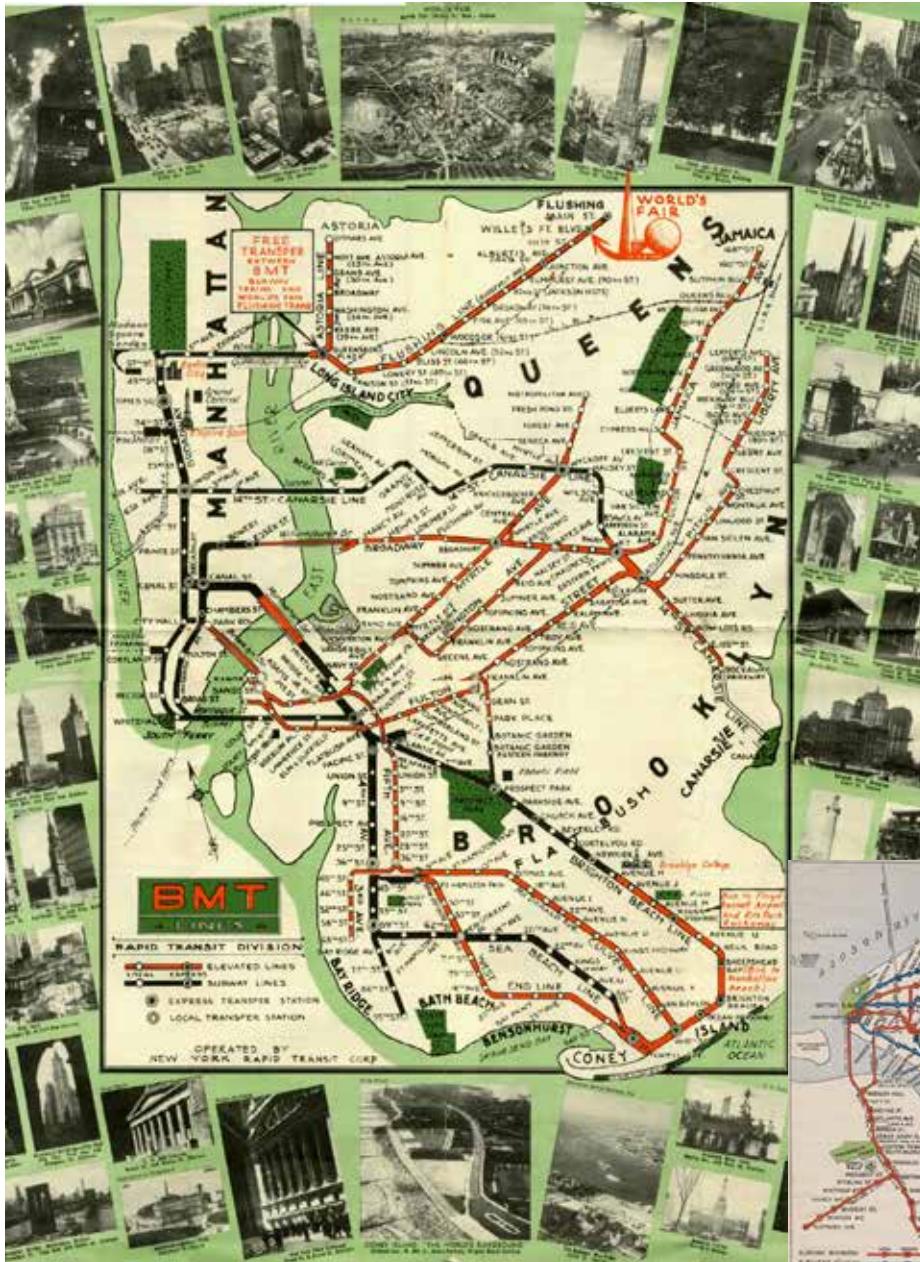




Top left
Heinz & Lafarge tiling at long abandoned City Hall station.

Top right
1938 IND system map designed by Arthur Weindorf.

Bottom right
1940 IRT by John William Grolz (probably check with Peter).



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NEW YORK CITY

THE RACE FOR SPACE

As the number of lines and complexity of the system grew, cartographers were faced with the inevitable challenge of how to show all the stations and services in the neatest and most comprehensible manner. New York City faced this issue faster than any other world system as it became so huge by the 1940s.

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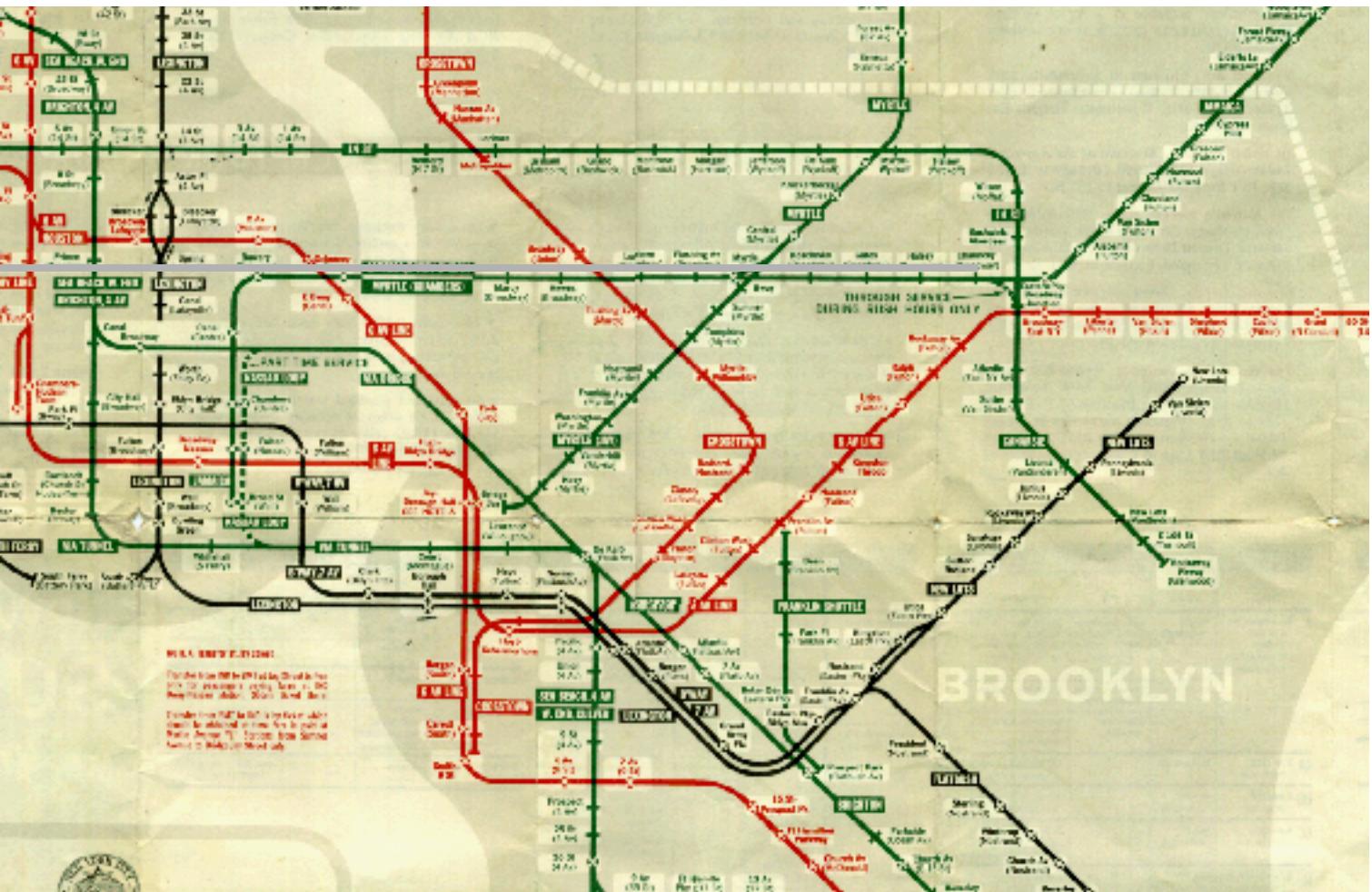
Right
Joint system board map of 1948.

Left
1950s fare token.

Opposite, top
George Salomens 1959 schematic.

Opposite, bottom right
Raleigh D'Adamo, 1969 design.





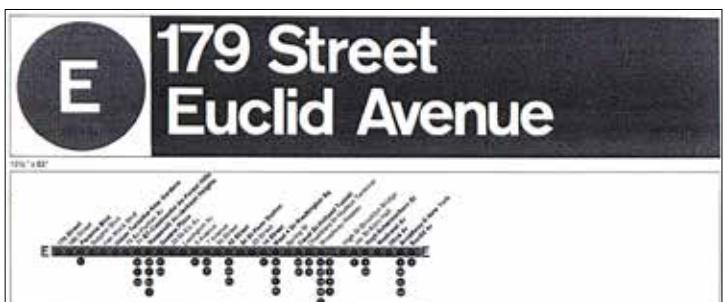
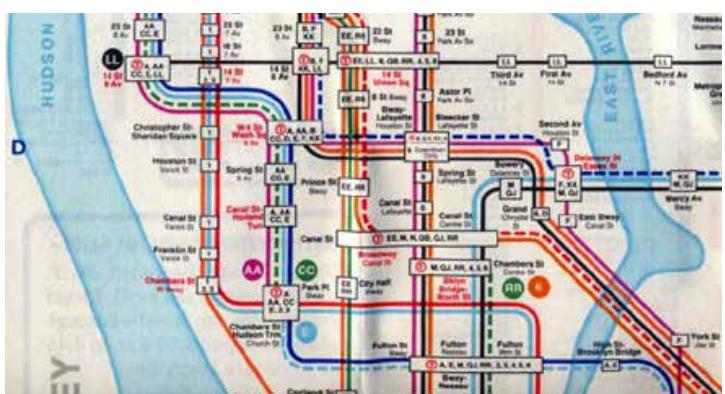
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NEW YORK CITY

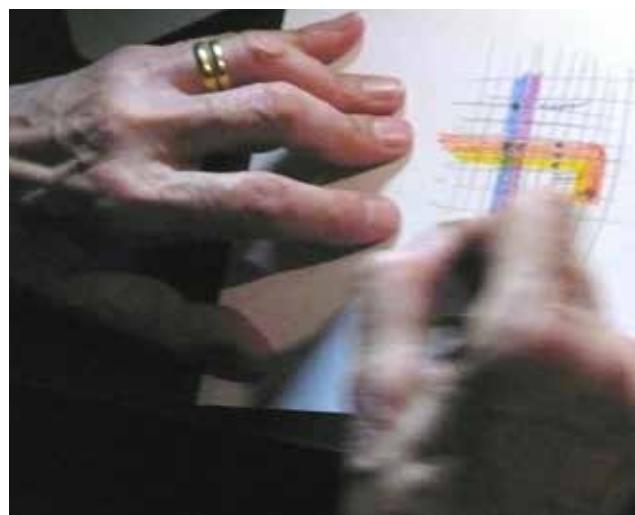
THE VIGNELLI SOLUTION

Italian American designer Massimo Vignelli had a vision for the entire look and feel of his home city subway system: it was a radical as it was practical. After his agency Unimark reformed the signage, the most obvious next step was the network map.

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Left

Early installation of the unimark graphics system on signage and map.

Above

Massimo Vignelli works by hand on connectivity grid.

NEW YORK CITY

A STRETCH TOO FAR?

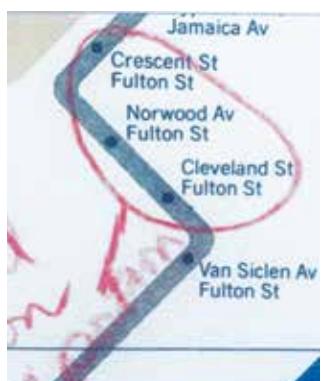
Vignelli's radical solution for mapping the New York Subway was not universally loved. A less schematic and more 'realistic' or geographically based design was approved in 1979.

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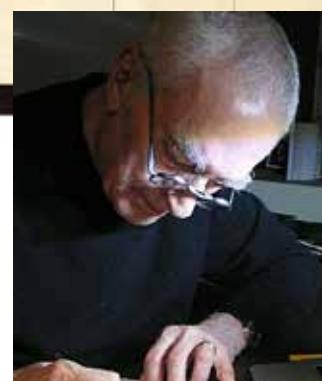
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Left
Vignelli's handwritten notes highlighting an area for improvement.

Right
First paper fold out 1972 diagram with designer Massimo Vignelli (inset).



"I just went with my heart"
Massimo Vignelli



Below
First paper fold out 1979 revised map by Hertz Associates with company boss Mike (inset).

ON THE MOVE AGAIN

After four decades of the Mike Hertz design, the MTA has been trialling alternate solutions for mapping its vast system, and schematics are back in the frame.

Bottom left
2017 online Weekender map.

Centre right
Trial display of geographic and schematic versions at xx St.

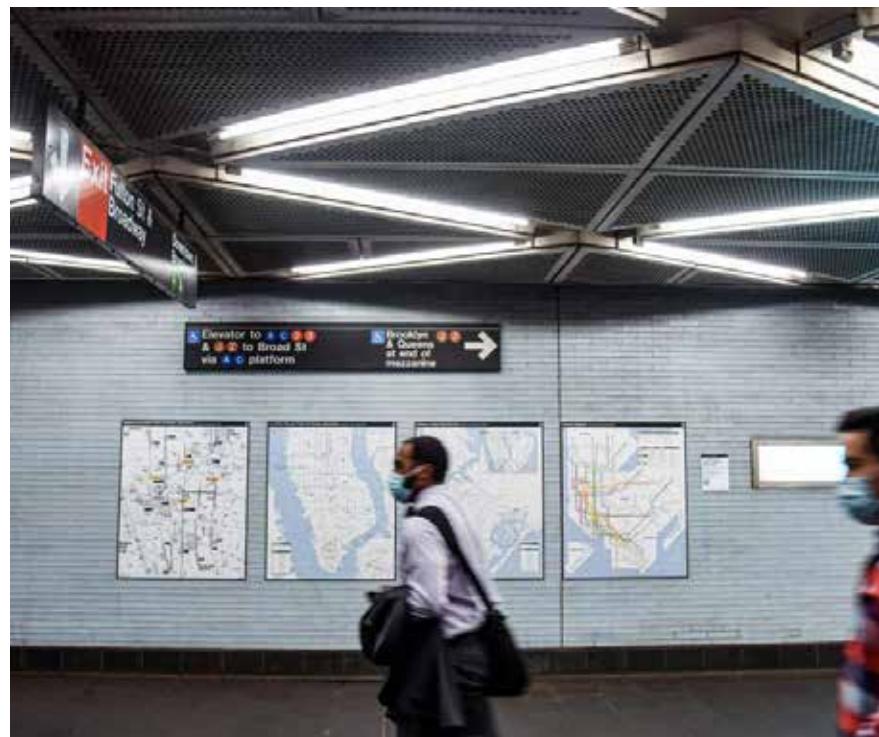
Opposite
2022 version returns to
Vignell-esque diagram style.

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Below
Beatrice
Cifuentes was
a consultant
working with
the MTA on
the return of
using schematic
forms.



"Updating Massimo's designs required a complete re-think"

Beatrice Cifuentes, Waterhouse Cifuentes Design



Subway Diagram Customer Information Pilot

The Bronx



Manhattan



Queens



Brooklyn



Staten Island



How to read this diagram:

- Stops all times
- Skips stop rush hour peak direction
- Skips stop hour & midday peak direction
- Fully accessible station
- Station Name
- Partially accessible station (direction of accessibility)
- Part-time express service: — Weekdays peak direction — Weekends peak direction
- Buses to LaGuardia airport: M60 SBS & LaGuardia Link Q70 SBS
- Commuter rail and recommended transfer station

Weekdays

6am to 10pm Saturday & Sunday

This subway diagram depicts typical weekday service. Service patterns vary throughout the day.

For details visit [mta.info](#) and read service and route signage.

Travel Info

Call 511 for info in English or Spanish at all times. Use Help kiosks in all stations. Look for the blue light. Visit [mta.info](#)

[mta.info](#)

[subway](#)

[muni](#)

[bus](#)

[lirr](#)

[nycrr](#)

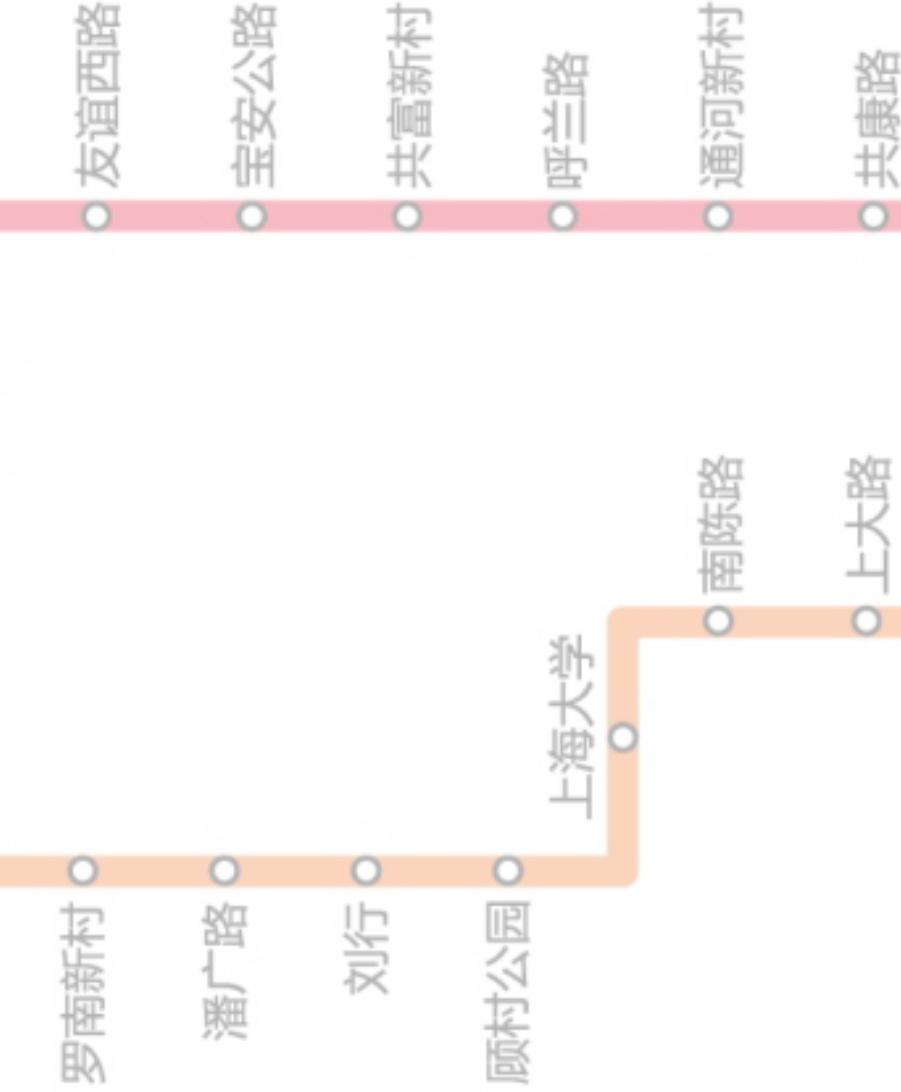
[nycsubway.org](#)

11 号线

7 号线

1 号线

Asia is home to 4,641 million people, but now has around 50 transit systems (150 if light rail and streetcars are counted also). The Asian systems now dominate the top ten of the longest track length and also nine of the top ten busiest in the world. While many Chinese cities are mapped with very similar looking diagrams, more design diversity exists elsewhere on the continent.

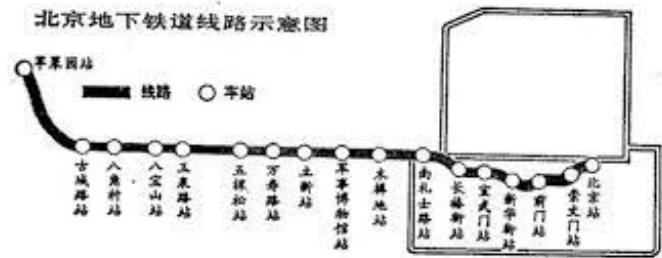




ASIA

BEIJING

When Peking opened its first single underground line in 1969, it was barred to tourists. Now Beijing has the world's second biggest and second busiest network with plans still on the drawing board that could make it the largest subway system on the planet.



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Above
Typical outdoor totem with embedded maps.

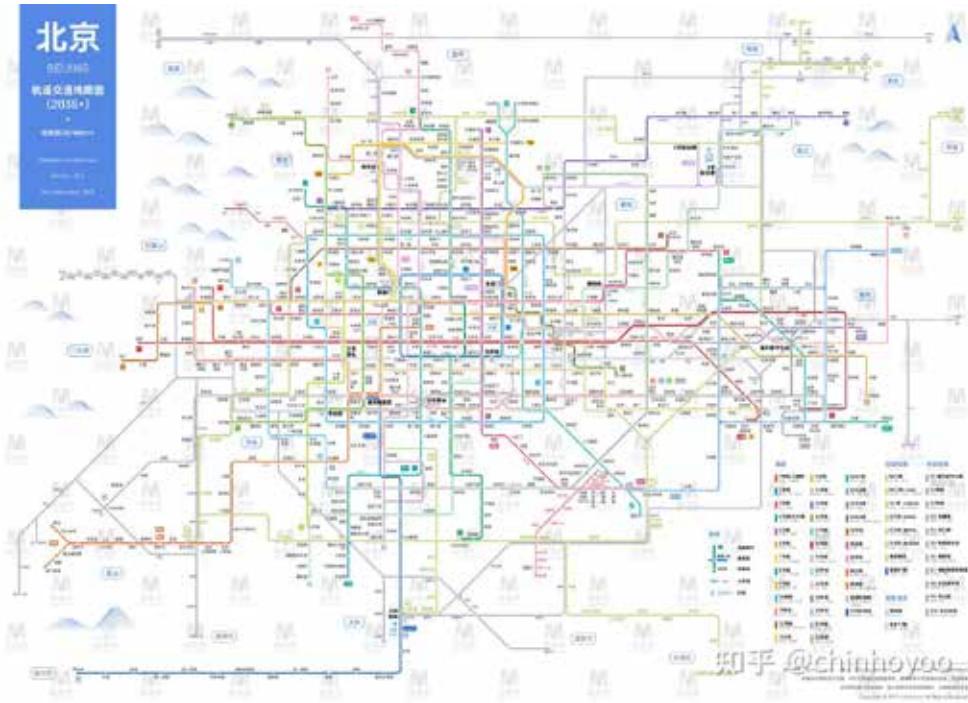
Left
Sketch of 1960s initial network plan.

Mid left
Official Beijing Subway map 1971 showing two proposed new lines.

Bottom left
Just after the 1984 opening of the inner loop.

Bottom right
The system as it existed just before the 2008 Olympic Games began.





Above
Schematic map designer Chinhooyoo.

Left
Chinhooyoo's diagram of Beijing in 2035.

Below
Official Beijing Subway map, 2022.





Top left
Current logo of private Tokyo Metro company (once TRTA).

Top right
Current logo of the TOEI operated by the local administration.

Middle left
Rudimentary 1920s sketch of the proposed first lines.

Right
1930s colour map shows the first subway line in red with proposed lines in other colours.

Below
Early Tokyo cars.



TOKYO

The city which was home to Asia's first underground railway is now the largest metropolis on the planet. Its subterranean rail network is now run by two operators, both of which produce modern diagrams. But it has not always been like this.



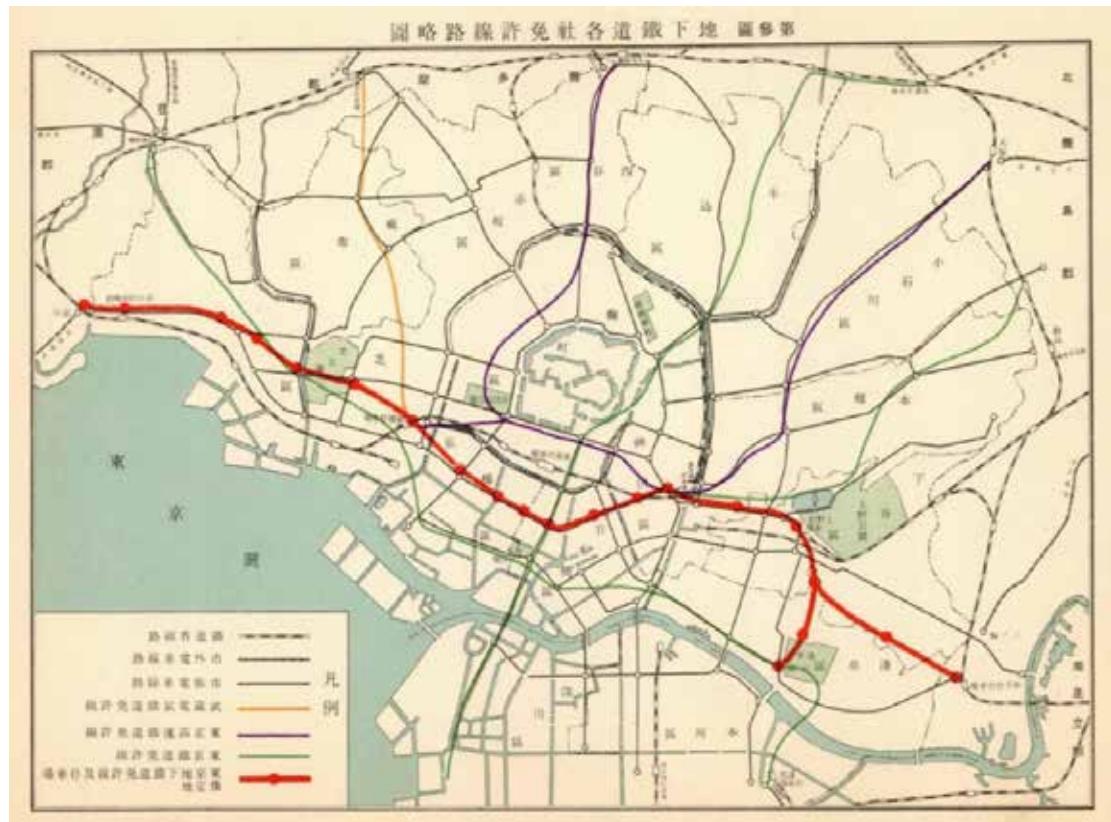
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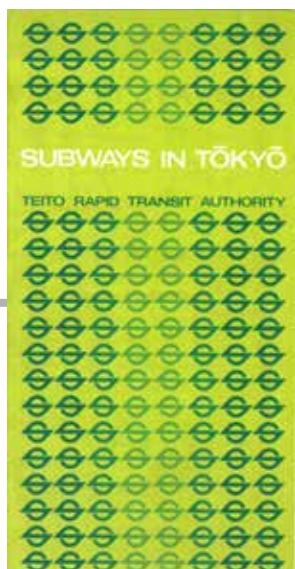
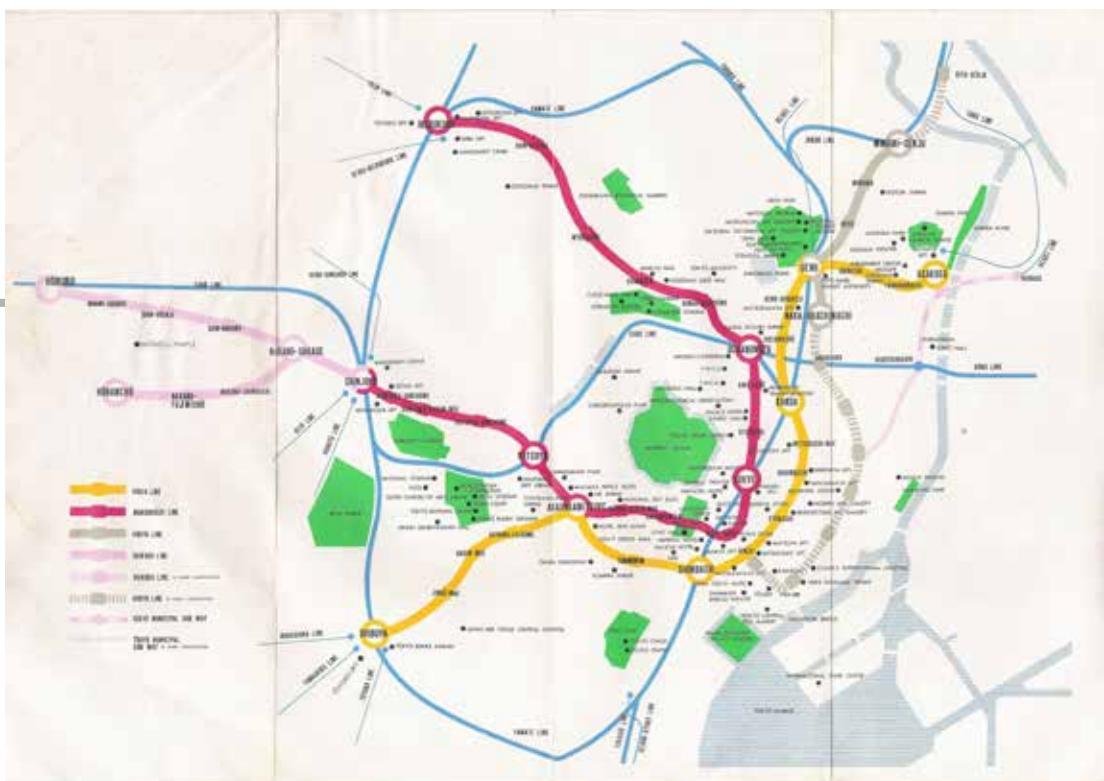
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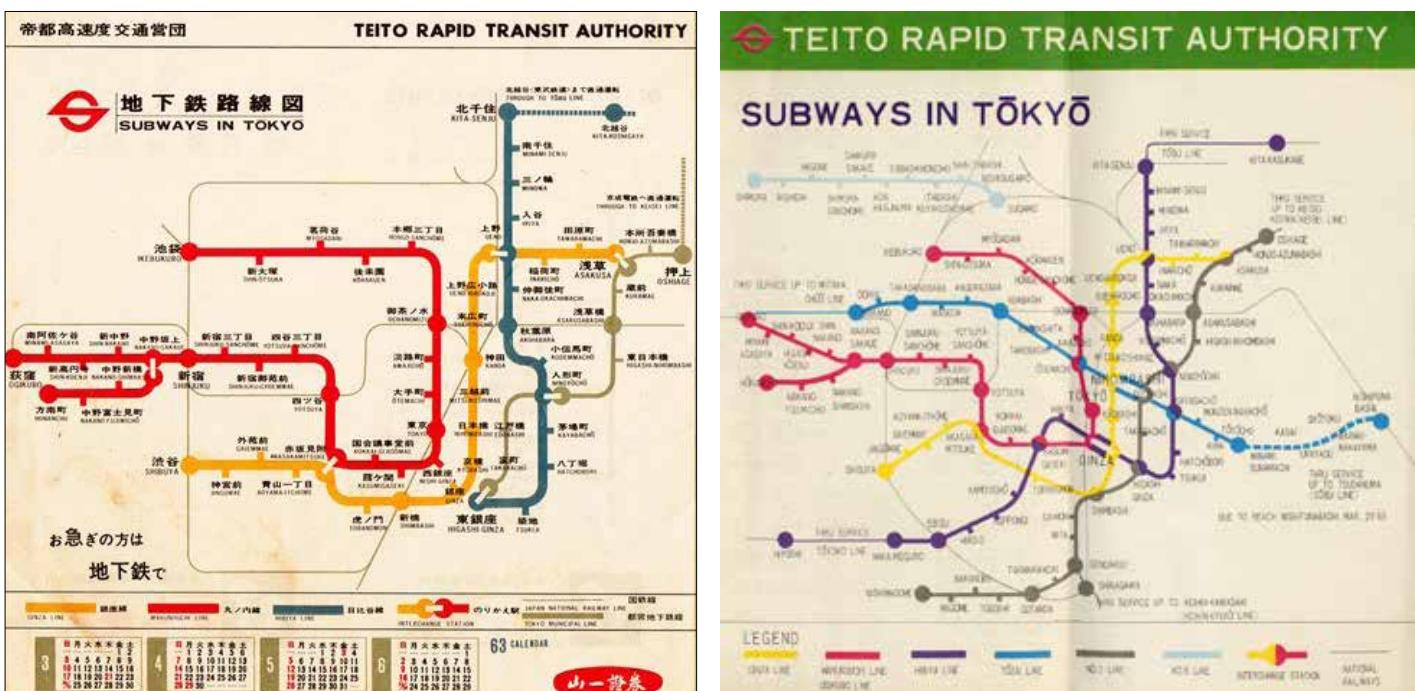
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Top left
By the early 1960s the Ginza line has been joined by xxxxx (opened 1938) with several other lines under construction.

Top right
Map cover, 1969



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quis nostrum exercitationem ullam corporis suscipit laboriosam, nisi ut aliquid ex ea commodi consequatur? Quis autem vel eum iure reprehenderit qui in ea voluptate velit esse quam nihil molestiae consequatur, vel illum qui dolorem eum fugiat quo voluptas

Centre left and right
While bilingual TRTA maps were turned diagrammatic by 1962 (left, calendar produced for the next year) those made for visitors (right, 1969) were less stylised.

TOKYO

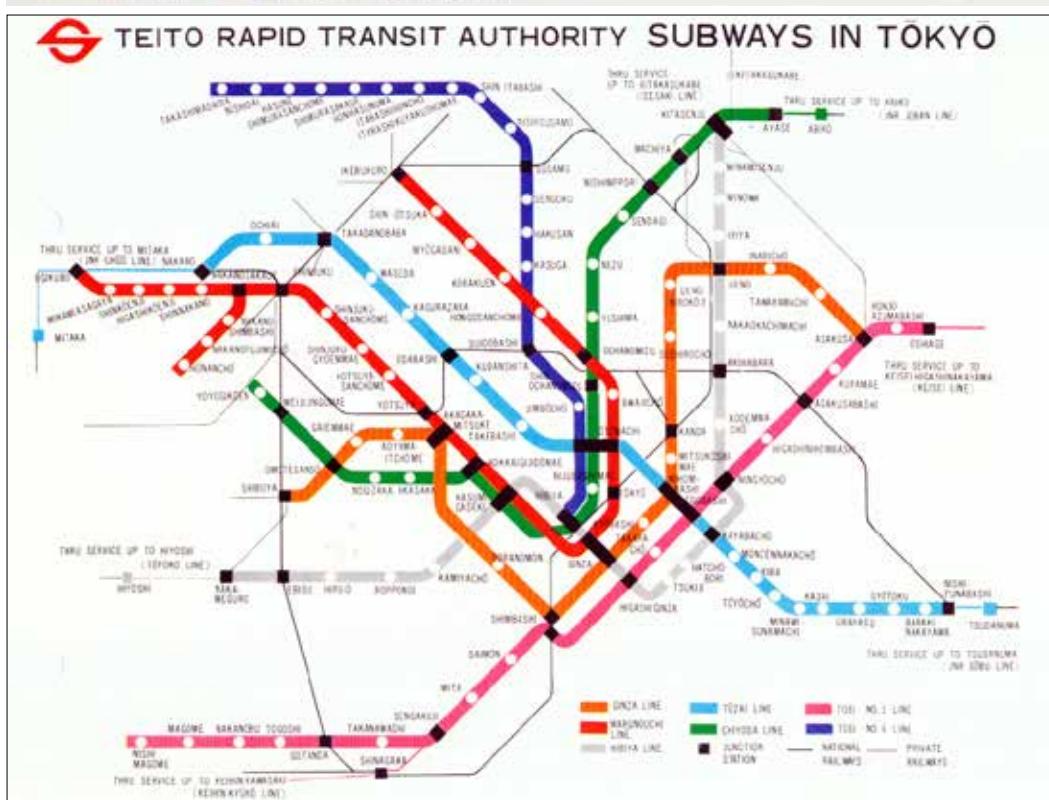
EXPANSION DEMANDS CLARITY

As new tunnels beneath the city opened, in the 1970s, so the need for cartographic improvements followed, yet the division of the network into two competing systems and some challenging styles caused some confusion for visitors.



"Schematics work well for Japanese thinking"

Dr Tatsuzo Akase, 1970s map designer.



Top left

Need to research, from Masa, date unknown presumed late 1960s/early 1970s.

Bottom left

English language diagram of 1972 based on a Japanese design of three years earlier.

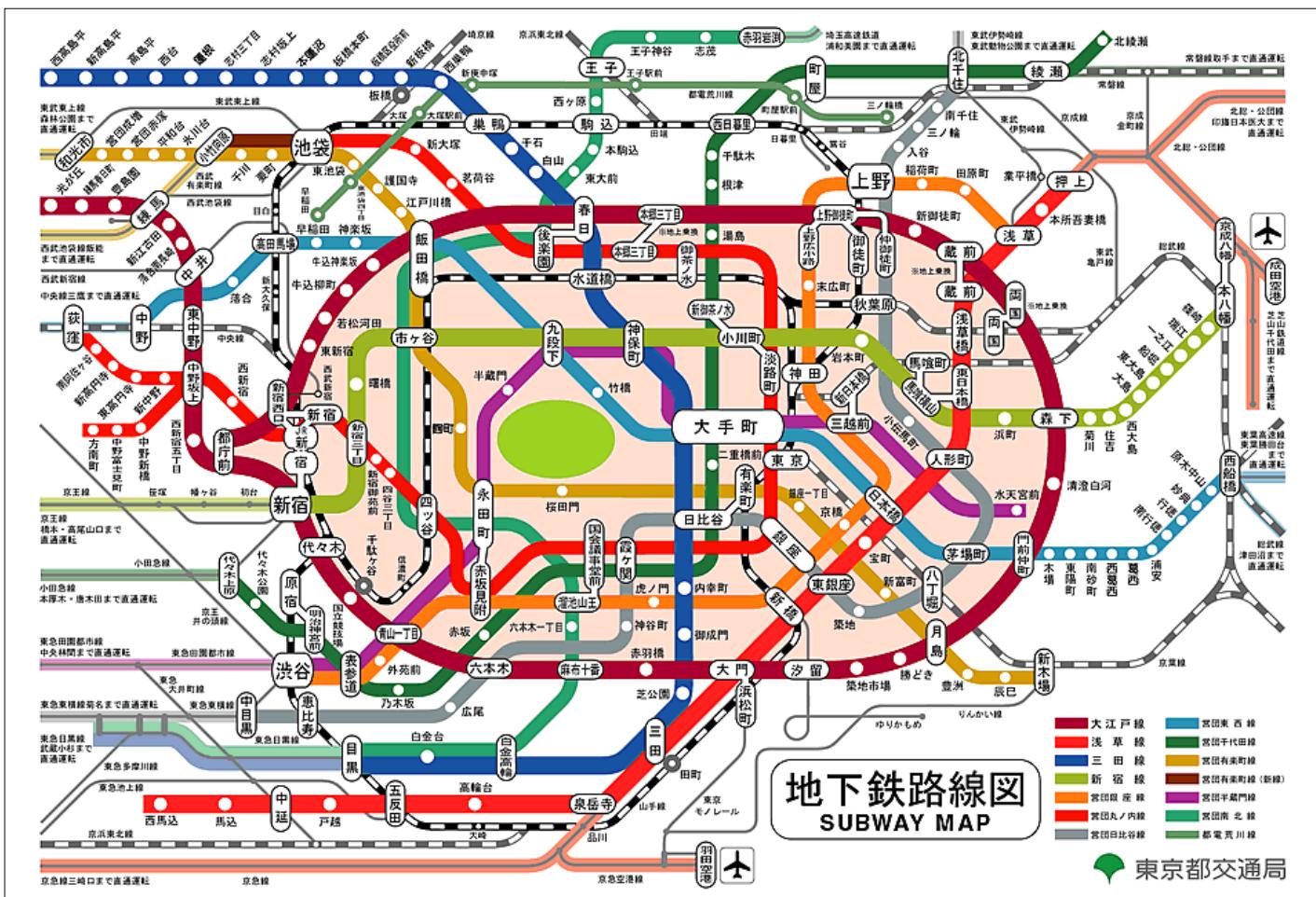
Top right and Opposite top left
Dr Tatsuzo Akase (above) began designing maps for Tokyo Metro in 1978. His inclusion of the station name within the interchange symbol was a facet that would last many years.

Opposite centre right

1997 ticket diagram need to research.



Top right & Bottom
Kanji Onishi (above) designed this early 2000s diagram.



TOKYO

APPEAL IN THE ROUND

Several designers have interpreted Tokyo from afar and seen its obvious circular appeal.

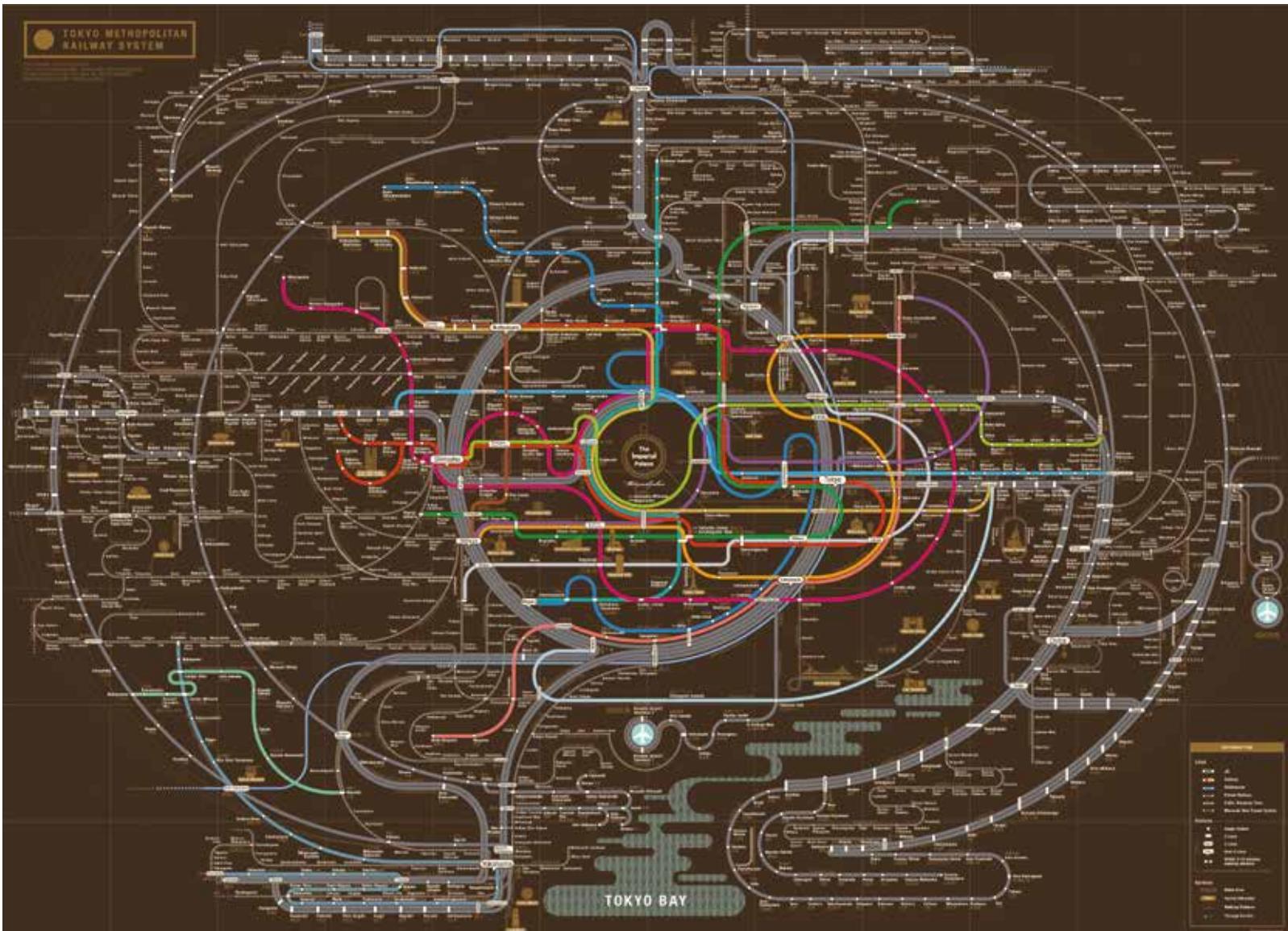
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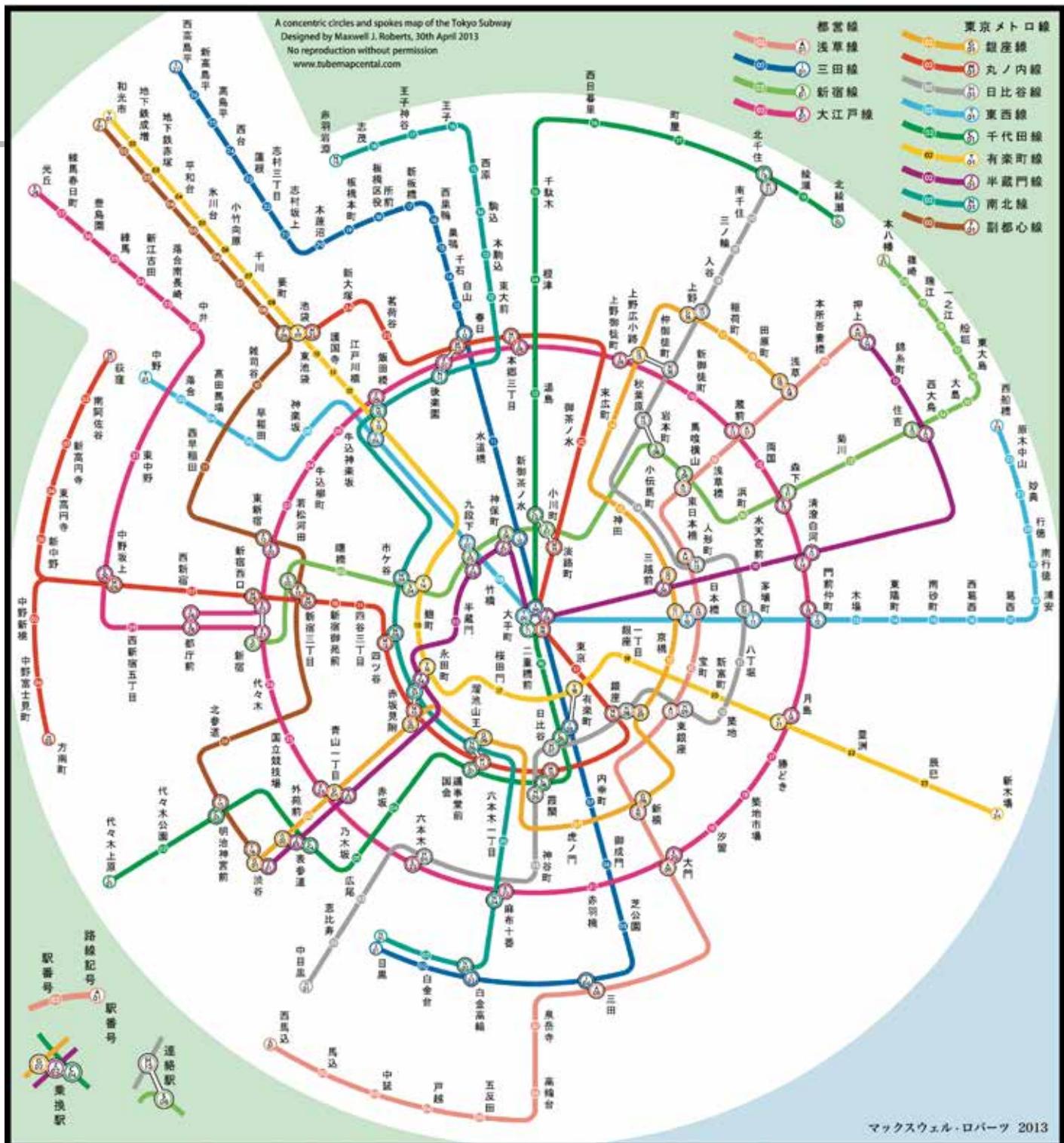
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voluptatem. Ut enim ad minima veniam, quis nostrum exercitationem ullam corporis suscipit laboriosam, nisi ut aliquid ex ea commodi consequatur? Quis autem m ipsam voluptatem quia voluptas sit aspernatur aut odit aut fugit, sed quia consequuntur magni dolores eos qui ratione voluptatem sequi nesciunt. m ipsam voluptatem quia voluptas sit aspernatur aut odit aut fugit, sed quia consequuntur magni dolores eos qui ratione voluptatem sequi nesciunt.

Bottom
2015 design by Kim Ji-Hwan and Jin Sol. Though their design agency is based in Seoul, they have a unique and innovative perspective on many world transit systems.





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Above
Concentric circles and spokes concept by Max Roberts, 2013.

TOKYO

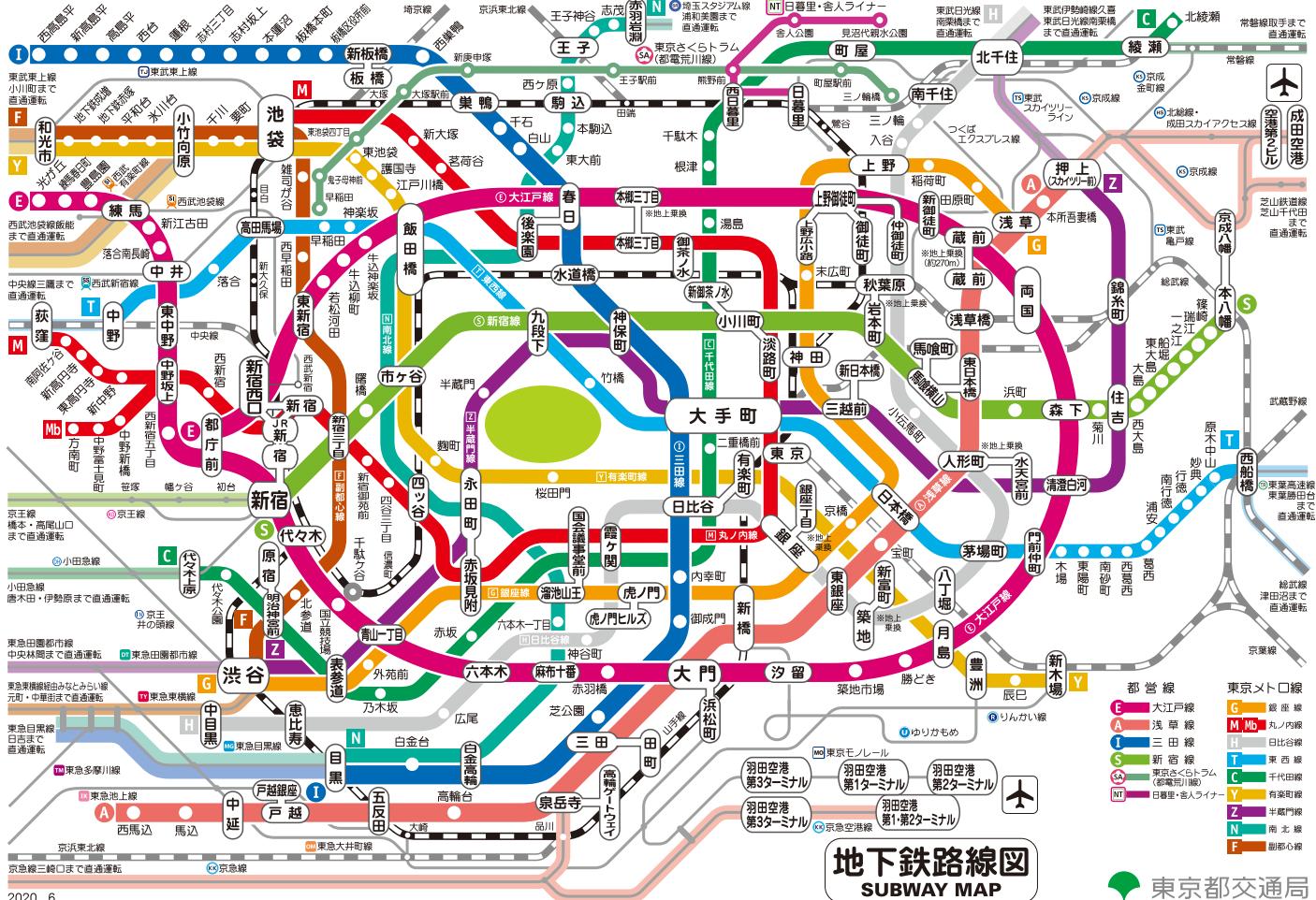
UNITY IS STRENGTH?

Showing all the lines together is surely preferable to having separate maps produced by each operator? Although great strides have been made towards standardisation there is still some independence between the two operators.

Below
2022 TOEI company official diagram, rooted in the '45-degree' angled standard and corralled by a central oval shape.

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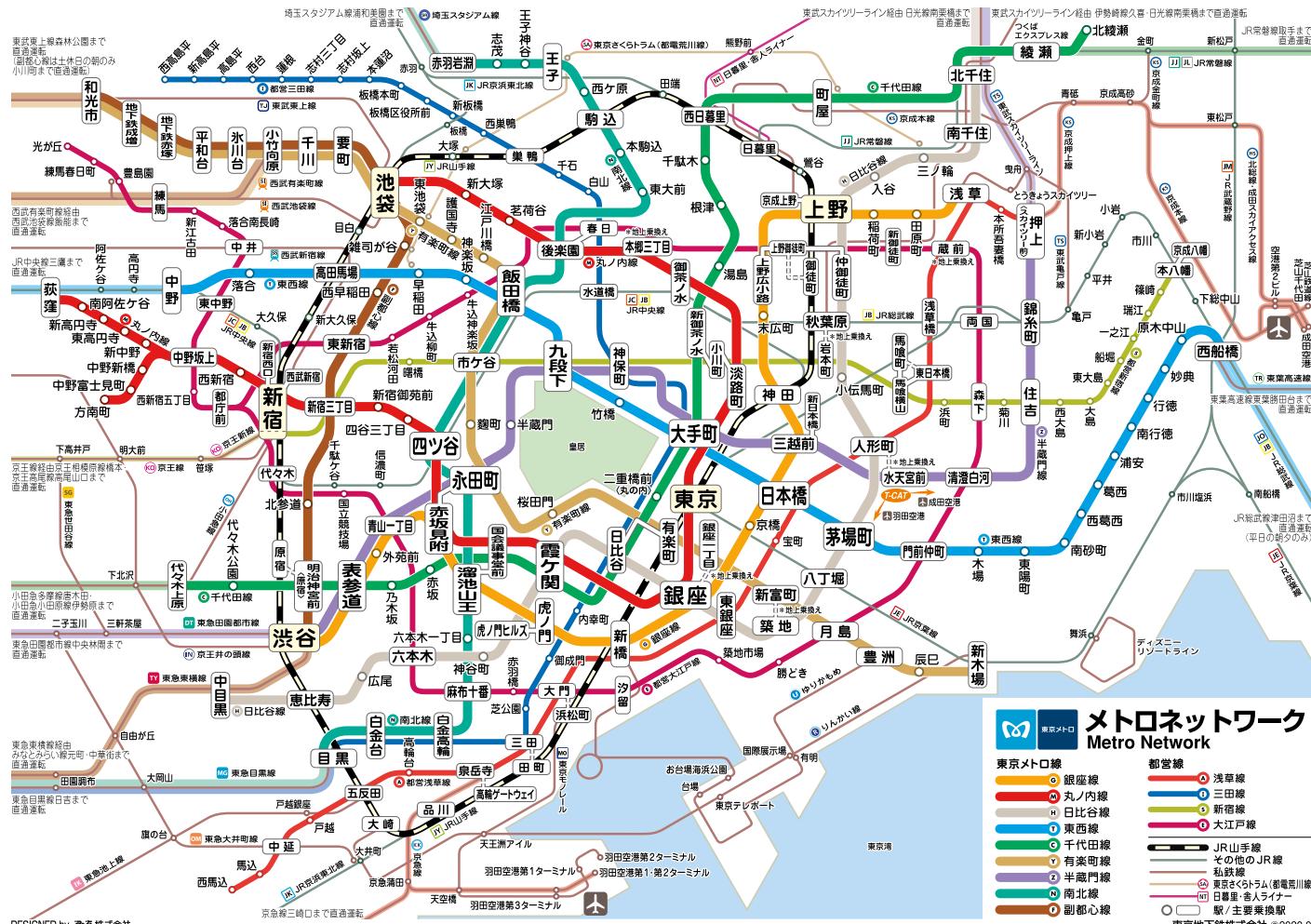




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Below
2022 Tokyo Metro company
official diagram based on
multiple angles.



WINNERS & SINNERS

Chosen by the design panel (see page 04), these are their most noteworthy of all the transit maps in the world.



MOST ICONIC

1. London (Beck era)
2. New York City (Vignelli)
3. Moscow
4. Washington D.C.
5. Barcelona

MOST INFLUENTIAL

1. London
2. Washington D.C.
3. New York City
4. Paris
5. Berlin

WORST

1. Kobe
2. Pittsburgh
3. London (current)
4. Warsaw
5. Rio de Janeiro

MOST NEW STATIONS DUE

1. Beijing
2. Delhi
3. Shanghai
4. Paris
5. Wuhan

INDEX OF DESIGNERS

RICHARD ARCHAMBAULT

Enthusiast for Mexico City / Montreal.

MIKE ASHWORTH

Ex Transport for London heritage manager.

HARRY or HENRY BECK

First London Underground schematic.

ILYA BIRMAN

Product and information designer.

CAMERON BOOTH

transitmaps.net blogger.

ANDREW BOSSI

Washington D.C. Metro map enthusiast.

VIKTORIA BRANDENBURG

Designs the Cologne network map.

JUG CEROVIC

Initiator of INAT system which has re-envisioned every network map.

CHINHOORYOO

Asian map redesigner.

BEATRICE CIFUENTES

Former assistant to Massimo Vignelli.

RALEIGH D'DADAMO

1960s New York Subway map designer.

TIM DEMUTH

1970s London Underground map designer.

GEORGE DOW

Creator of schematic 'dowagrams'.

TIM DUNN

Rail enthusiast and TV presenter.

STAS EFREMOV

Moscow tram map designer.

EMMANUEL FEDON

Head of design agency BDC Conseil: revolutionised Paris Metro map and others.

ALAN FOALE

London Underground map designer via PulseCreative agency.

PAUL E GARBUTT

1970s London Underground map designer.

McDONALD GILL

Designer of 19xx London Tube map.

STANLEY GOLDSTEIN

Designer of 1960s NYC Subway map.

ZHAN GUO

Professor of Urban Planning and Transportation policy, NYC.

MIKE HERTZ

1978 NYC Subway map redesign.

HAROLD HUTCHINSON

Followed Beck's work on the London Underground map, 1960s.

MECCA IBRAHIM

Commentator on London Tube issues.

EDDIE JABBOUR

Designer of NYC KickMap.

KIM JIHWAN

Runs zeropersero agency which redesigns world transit maps.

ANNA KAGERVALL

Familjen Head of Design.

YO KAMINAGAI

Head of Design for RATP and crucial for Paris Metro makeover, job at UITP.

HYUN-SOO KIM

South Korean designer.

F. LAGOUMETTE

1950s Paris Metro map designer.

ARTEMY LEBEDEV

Designer of Moscow metro map.

MICHAEL LEJEUNNE

Head of Los Angeles Metro design.

PETER B LLOYD

Author of books on NYC Subway map.

SERGIO LUKE

Not sure yet need to research.

PAUL MIJKSENAAR

1980s Amsterdam Metro map and others.

RUDI MYER

Paris RER & SNCF map designer.

SONG PHANEKHAM

Something important at RATP.

SIMON PLATT

Transport for Greater Manchester.

GEORGES REDON

1950/60s Paris Metro map designer.

MAXWELL ROBERTS

Professor of transit map design!

DOUG ROSE

Designed London diagrams in the 1980s and runs own agency now.

PATRICE ROUXEL

1970s Paris Metro map designer.

NEIL SADLER

Los Angeles Metro designer.

GEORGE SALOMON

1960s NYC subway map designer.

RAFA SANUDO

Designer of 2000s Madrid Metro map.

ROBERT SCHWANDL

Runs urbanrail.net and mapped every system on the planet.

RONALD SHAKESPEAR

Designer of Buenos Aires SUBTE map and system rebranding.

ANDREW SMITHERS

Runs projectmapping website, designer of BR national map.

ERIK SPEIKERMANN

Designer of Berlin reunification U-Bahn map and transit typefaces.

F. H. STINGEMORE

1920s London tube map designer.

JOHN TAURANAC

Designer of NYC Subway, Bus and street maps 1970s-present.

TANIA TOMIC

Designer of Vienna map.

LOUISE THOMPSON

Manchester Metrolink designer.

JENS UNGER

Berlin U-Bahn network map. designer

RAUL CASAS VELO

Barcelona metro map designer.

MASSIMO VIGNELLI

1970s New York Subway map and signage designer, via Unimark agency.

PAUL D. WADE

Runs metropiamaps.

JARRET WALKER

Runs HumanTransit.org

MICHAEL WALTON

Ex London Transport Museum trade head.

ROBIN WOODS

Runs cartographia which maps metros.

LANCE WYMAN

Mexico City Metro map and station identity designer.

LOADS MORE TO ADD!!!!!!