Bicycles are permitted on Light Rail and Metro Subway, except on crowded trains.

Inquiries into the design of transit
Peter Bain
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You can forward my notes along if you want.

Have a great Thanksgiving.

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Suggest local groups consider for policy (or position? endorse? etc.):
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The geographic reach of rail transit systems proved a spur to map innovation. By the beginning of the twentieth century, mapmakers were compressing the scale of far-flung line extensions, and enlarging central districts to better show the concentration of stations there. Another trend was simplification. When routes were depicted with limited reference to surface features, they could be straightened and separated from one another more easily.

A 1924 Boston transit map omitted all geography, and abstracted the routes into a series of line segments showing the interlocking nature of the system.

Henry Beck’s 1933 London Underground map is often called a diagram. His background as a draftsman made it possible for him to simplify and visually elucidate various aspects of the London Underground. Beck’s design was notable for the way he distorted and shifted the routes to give visual order to the transit network and evenly spaced stations on the map. He brought certain lines into vertical or horizontal alignment to make a more understandable pattern. Further, he combined a series of regularized curves with diagonals constrained at 45° to the verticals and horizontals, giving the system a more cohesive appearance.

Simple tick marks were used to indicate stations, and the problem of clearly indicating transfers between lines was explored in successive versions. By 1946 he revived an earlier marking of these stations by linking their open centers, forming a “white-line connector” for transfers.

The same trend continued into the 1970s. In 1968 Michael Hertz made a map for the New York subway system that entailed transfers or additional stops if one follows the station positions on the diagram. Vignelli made similar trade-offs when creating his map, and New Yorkers found it less acceptable.

To add further criticism, a study undertaken by psychologist Arline Bronzaft demonstrated the problems newcomers to New York had when navigating the subway. When she and her co-authors published their results in 1976, they included suggestions for improvements of the map, subway signage and other wayfinding aids such as announcements. One particular area of concern for the study was the indication of transfer points on the map. The clustering of dots to indicate transfers were the source of some confusion, especially since a configuration could include thin black lines to join separate dot groups.

A committee was organized by the MTA, the agency responsible for the subway system, and chaired by John Tauranac. The designer Michael Hertz was engaged to devise a new map. His solution was to group transfers at stations that shared similar routes and logically give them the same color. Hertz and Tauranac also rejected Beck and Vignelli’s approach of constraining routes to fixed orientations, returning to the sweeping curved routes used in earlier maps such as Hagstrom’s.

This eliminated Vignelli’s rainbow of neat parallel lines and conserved space on the map, permitting the re-introduction of key streets and even landmarks. While the geography of the city was still distorted to a large degree, key features such as Central Park were now closer to their actual shape and became bounded by primary streets. After a period of development, Michael Hertz’s map was put into use in 1979.

Vignelli has criticized the hybrid nature of the current map, maintained by Michael Hertz Associates, since it contains both a transit network and geographic information. While the result is more cluttered, especially with 1999 inclusion of major bus and commuter rail lines, it is equally more informative, allowing transit users to draw connections between the system and the surface. The marking of transfers is still problematic on the current New York map; Tokyo and other European systems resort to large boxes placed over interchanges between transit lines.

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While the challenge of transit map design is to make a network intelligible, there is no unanimous opinion on what constitutes a successful solution. The question of appropriateness must be resolved individually in each situation. The London Underground map provides a useful design template, but the New York story is a counter-example. One visually elegant solution was embraced and another found lacking when it could not meet the needs and expectations of transit users. The opposition between gallery aesthetics and everyday reality posed by The Washington Post obscured the nature of design for transit maps. It turns out that good transit design is part art and part function; but the largest part is that which best interacts with people.
Vignelli’s map used a palette of many colors to distinguish between the lines, making it a striking composition. Like Beck, he constrained routes to horizontals, verticals, and related 45° angles, and employed consistently curved segments. The New York subways are unusual in that they include trains that make limited or “express” stops with those that make all stops, referred to as “local” trains. All stops were marked by a black dot, in the center of each route, but the names of stops served by both local and express trains were set in bold type. Following the lead of the London diagram, the shapes of the boroughs and the shore lines were highly abstracted, and the border between Brooklyn and Queens omitted. The intention was to create a clear, unified network.

There was an additional component to Vignelli’s map, something not found in Beck’s map. On the back of the subway map was a directory or listing of stations. This part of the map is rarely reproduced or considered noteworthy. Yet it was a valuable component, since there is a proportion of transit users that have poor map-reading skills or cognitive difficulties with visual graphs. These users have to rely on itineraries or lists of stations, whether verbal or written, to navigate through a transit system. The directory gave station locations on the map using a grid that identified subsections by letter and number. By looking up the grid locations of starting and ending stations, riders could find them on the map without prior knowledge and avoid a potentially frustrating search.

In the 1979 Washington Post story, the writer imagined Vignelli’s transit map as the offspring of pop artist Peter Max, painter Piet Mondrian and colorist Morris Louis. Unfortunately, while The New York Times architecture critic Paul Goldberger also admired its formal qualities, the map did not meet with equivalent functional success. One frequent criticism was that it did not show Manhattan’s street grid, the best aid to wayfinding in that portion of the city. New Yorkers were familiar with the streets, and claimed that Vignelli’s design offered insufficient help for travel to and from subway stops on the surface.

In his defense, Vignelli has maintained that his map was a diagram for the subway network only, since portraying the streets of New York accurately is impossible on any reasonably sized single sheet. Part of the reason for the success of Beck’s London map is the complicated, historic tangle of London’s streets. Beck merely attempted to render the Underground understandable. There are well-known examples of London stations separated by only a short walk on the street.

Created on his own initiative, without any promise of compensation, Beck’s map was released in 1933 and generated unexpected public demand. As Underground riders expressed their preference for its depiction of their system, it became a design landmark. Beck’s transit map shows a strong resemblance to engineer- ing diagrams, which value simplicity and parsimony in representation. This forms an important part of its aesthetic appeal. Beck continued the use of color to identify particular lines, and the diagram’s regularized structure allowed riders to create groupings among various areas or routes to help simplify their choices. He also paid careful attention in handling the station names, to avoid crowding them, since legible typography is critical when searching for a particular station.

But across the pond, the New York subway was evolving in a separate manner. The subways had started as separate companies in competition with each other. The lines converged downtown at the tip of lower Manhattan, creating a challenge for any skilled mapmaker. It was not until 1940 that the two remaining subway companies and the municipal lines were unified. When the entire system was represented by cartographer Andrew Hagstrom in 1948, he oriented Manhattan vertically, based on earlier maps, since that allowed the boroughs of Brooklyn, Queens and The Bronx to extend rightward. The map employed distortion and simplification to clarify the routes, but did not apply the fixed geometry of Beck’s approach.

Hagstrom’s map was followed by other proposals. Based on his experience developing New York subway signage while a partner at Unimark International in the 1960s, designer Massimo Vignelli was selected to create a new map. There had been prior schematic designs for the subway map, but Vignelli’s distinctive 1972 contribution attracted controversy and ultimately was replaced in 1979. Understanding both the strong and weak aspects of his transit map design is instructive. He was well aware of Beck’s design for the London Underground. >
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– Shouldn’t express buses stop at the transit center? Certainly the transit center is a useful location to pick up riders heading outbound as well? Could build two-way traffic depending on frequency of service.

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– Other (comparable) cities experiences with transit centers? What are the benefits besides people not having to wait on street corners for connecting buses? More on-time buses on shorter routes? Faster end-to-end travel?

For discussion:

If transfer center budget is $40-$60 million, yet BRT is $2-$3 million per mile, why is the transfer center the priority project? Is the BRT project a sure thing? Given the I-64 East commuter bus proposal, the BRT system should run to Short Pump, which is not supported by Henrico.
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