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■ COLUMN ONE

"GIVE THE KID A BREAK"

Several of our readers have either written in or telephoned, castigating TC for not castigating AMTRAK. They cite poor scheduling, high fares and even too little service, qualitatively speaking, and suggest we take issue with the Corporation, which to some appears to be nothing more than yet another gigantic governmental boondoggle.

Sorry, readers, but we would rather castigate you for the sin of impatience. As these words are written, AMTRAK has been in business less than five months, and in those 150 days has already managed to bring some order out of the chaos that was America's railroad passenger service until May 1.

For the first time, some semblance of rationality has been given the system, and though it admittedly be a small accomplishment, all service is indicated in a single timetable much easier to carry about than the Official Guide. Many sensible connections and consolidations have been made (along, perhaps, with a few that defy reason) and the artificial "competition" that was so carefully nurtured by the ICC (and which contributed so much to the downfall of the passenger train in the U.S.) has been eliminated. Unlike a hog, a human may still be unable to cross the U.S. in a passenger train, but he has at least a chance of making decent connections.

Then, too, although it is still not above the horizon for most consumers, there is the beginning of a marketing program (the mere existence of which is a significant improvement over the "good" old days) carefully and expertly designed to create awareness of the existence of the passenger train in the first place, and to create a desire to use it in the second.

Granted, there is yet a very long way to go before the U.S. rail passenger system even approaches the greatness of its European counterpart, but a reasonably sound program is at least underway. Much remains to be done: the cumbersome and outrageous fare structure must be reworked; there is no reason for air travel (first-class, yet) to be significantly cheaper than roomette travel by rail, say, between New York and Chicago, for example.

And there is the matter of scheduling. Even without any right-of-way improvements, trains can still be speeded up significantly without compromising safety; whatever became of the nonstop Metroliners, for one? The advantages of downtown-to-downtown travel in terms of speed vs. jets over intermediate distances has still to be exploited properly.

But you can't fault AMTRAK for everything. The Corporation has managed, in the short space of four and a half months to create reason in the assignment of rolling stock, something the individual carriers were unwilling and/or unable to do for over a hundred years. Such accomplishments deserve a tolerant attitude at the very least, if you're not in the mood for adulatory praise. Five months is not a very long time for miracles to happen--give the kid a break.

--Richard R. Kunz

METRO MEMO

VITAL STATISTICS

■ DOT has released a market survey of transit car demand and supply that shows some interesting figures. As to demand, UMTA notes that 1202 rapid transit and commuter rail cars are now on order, and estimates that additional orders for 2754 cars will be placed during the next three and one-half years, through December 30, 1974. Total estimated effective demand is 3956 cars.

These cars are now on order:

GENERAL ELECTRIC COMPANY		424
Metropolitan Transportation Authority		
Long Island Railroad	152	
Penn Central--New Haven Division	144*	
Penn Central--Harlem and Hudson Divisions	128	
GENERAL STEEL INDUSTRIES (ST. LOUIS CAR DIVISION)		482
Metropolitan Transportation Authority		
New York City Transit Authority	300	
Staten Island R.T. Operating Authority	52	
Chicago South Suburban Mass Transit District		
Illinois Central	130*	
ROHR CORPORATION		250
Bay Area Rapid Transit District	250*	
HAWKER-SIDDELEY CANADA LIMITED		46
Port Authority Trans Hudson Corporation	46	
TOTAL, U.S. SYSTEM CAR ORDERS		<u>1202</u>

(*Funded with Urban Mass Transportation Administration capital grant assistance)

Capital grants have been made for the following car purchases; orders for these cars should be placed in the near future:

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY	RT	44
SAN FRANCISCO MUNICIPAL RAILWAY	LT	78
SOUTHEASTERN PENNSYLVANIA TRANSPORTATION AUTHORITY	CR	144
STATE OF NEW JERSEY	CR	45
TOTAL CARS IN APPROVED GRANTS		<u>311</u>

(RT--Rapid Transit; LT--Limited Tram; CR--Commuter Rail)

In addition, UMTA estimates that orders for 2443 cars will be placed between the present and December 31, 1974, breaking down as follows:

METROPOLITAN TRANSPORTATION AUTHORITY		
New York City Transit Authority	RT	900
Long Island Railroad	CR	60
CHICAGO TRANSIT AUTHORITY	RT	150

PORT AUTHORITY TRANS HUDSON CORPORATION	RT	124
PORT AUTHORITY TRANSIT CORPORATION (DRPA)	RT	98
BAY AREA RAPID TRANSIT DISTRICT	RT	200
WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY	RT	300
MASSACHUSETTS BAY TRANSPORTATION AUTHORITY	LT	100
PENN CENTRAL (North Jersey)	CR	135
ERIE LACKAWANNA	CR	220
ILLINOIS CENTRAL RAILROAD	CR	25
CHICAGO SOUTH SHORE & SOUTH BEND	CR	20
BURLINGTON NORTHERN	CR	25
CHICAGO MILWAUKEE ST. PAUL & PACIFIC	CR	36
CHICAGO ROCK ISLAND & PACIFIC	CR	50

TOTAL CARS	<u>2443</u>
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Car orders on hand	1201
Cars in approved grants not yet ordered	311
Cars to be ordered by 12-31-74	<u>2443</u>
TOTAL CARS	<u>3956</u>

■ With respect to supply, there are four active car builders in the U.S. at the present time; the following data is based upon estimates made by each builder. It assumes production on a normal basis, with no significant amount of overtime and no plant expansion:

	<u>ANNUAL CAPACITY</u>	<u>POTENTIAL PRODUCTION THRU 1974</u>
GENERAL ELECTRIC CORPORATION	550	1925
GENERAL STEEL INDUSTRIES (ST. LOUIS CAR)	500	1750
PULLMAN STANDARD, INC.	300	1050
ROHR CORPORATION	350	1225
TOTAL	<u>1700</u>	<u>5950</u>

Estimated production capacity to 12/31/74	5950
Deduct cars now on order	<u>1202</u>
	<u>4748</u>

Deduct estimated effective demand to 12/31/74	<u>2443</u>
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Unused capacity	2305
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■ One hundred of the cars noted to be ordered within the near future are earmarked for replacement of the 80-odd remaining 1922-24 Cincinnati-built 4000 series units in service on the CTA, as well as the four "doodlebug" articulated 1947-built 51-series (formerly 5000-series) cars. As noted herein some weeks ago, the Authority plans to spend \$120,500,000 of local, state and federal funds in the next two years for capital improvements. Mayor Daley revealed last week that this program will be only the first step in a \$283,000,000 program for five years that will presumably also include the RT extension to O'Hare "unveiled" in

a surprise announcement by the Mayor in Pittsburgh last week. The enlargement of the capital program and the O'Hare "commitment" have prompted speculation that the downtown subway program (to cost almost \$1,000,000,000) has been quietly dropped from the priority list because of the obvious lack of funds for all of the projects outlined.

■ To fill in the table of equipment on order now or already committed, some notes are in order. With two exceptions (noted below), all the equipment outlined therein is for replacement of outmoded rolling stock currently in service, some dating back to the 1920's and before, or to add (as in the case of PATH) additional units to accomodate increased traffic on an existing system.

In the case of BART, of course, the 250 cars ordered will inaugurate service on the entirely-new system some time in 1972. MBTA has asked for (and received UMTA approval) 44 cars for the Haymarket North Extension. It should be further noted that figures given for cars to be ordered by the end of 1974 are estimates based on need (and presumably financial ability of the carrier or someone else to come up with the matching funds), and are by no means firm indications of what the future might bring.

THE HUB MOVES FORWARD

■ Further data on MBTA's Capital Program:

CURRENT PROGRAM OF EXPANSION AND MODERNIZATION

Project	Anticipated Budget	SOURCE OF FUNDS (In Millions)			
		MBTA Bond Authorization	Federal Transit Aid Granted	Anticipated	Other Aid
South Shore Extension	\$124.0	\$ 65.9	\$ 35.2	\$18.8	\$ 4.1
South Bay Maintenance Center	35.6	10.1	—	20.3	5.2
Haymarket-North Extension	166.4	84.4	63.2	6.8	12.0
Plant Modernization	10.6	6.4	—	2.0	2.2
Station Modernization	14.6	7.2	6.1	—	1.3
Southwest Corridor - South Cove Tunnel	17.0	16.2	0.5	—	0.3
Construction Administration	10.5	10.5	—	—	—
Revenue Equipment Replacements	19.6	16.5	3.1	—	—
Acquisition of Private Carriers	0.4	0.4	—	—	—
Railroad Service Contracts	5.0	5.0	—	—	—
Central Area Systems Study	1.0	0.5	0.5	—	—
Non-Revenue & Other Equipment	1.3	1.3	—	—	—
Harvard-Alewife Extension	0.6	0.6	—	—	—
TOTAL	\$406.6	\$225.0	\$108.6	\$47.9	\$25.1

PROPOSED 1971 - 1975 PROGRAM OF EXPANSION AND MODERNIZATION

Project	Estimated Cost in Millions of 1971 Dollars		
	Total	New MBTA Bonds	Federal Transit Aid
South Shore Extension — South Braintree to Weymouth	\$ 30.0	\$ 10.0	\$ 20.0
Southwest Corridor Extension to VFW Parkway, West Roxbury	156.0	52.0	104.0
Harvard-Alewife Extension	150.0	50.0	100.0
Pines River Extension	31.5	10.5	21.0
Surface Car Lines & Central Subway Improvements	54.0	18.0	36.0
Station Modernization	9.0	3.0	6.0
Consolidation of Bus Garages	13.8	4.6	9.2
Power Distribution Improvements	9.0	3.0	6.0
Other Plant Improvements	9.0	3.0	6.0
Revenue Equipment Replacements	24.0	8.0	16.0
Technological Innovations	6.0	2.0	4.0
Administration and Overhead (1%)	4.8	4.8	—
Sub-Total	\$497.1	\$168.9	\$328.2
Reserve for Inflation	100.0	53.8	46.2
Sub-total	\$597.1	\$222.7	\$374.4
Reserve for Commuter Railroad Assets Acquisition and Improvements	25.0	25.0	—
TOTAL	\$622.1	\$247.7	\$374.4

EXPANDING THE SYSTEM

- Southwest Corridor Extension to VFW Parkway, West Roxbury. This extension would capitalize on the single largest transit market in the region and would permit competition of the South Cove Tunnel and the abandonment of the Washington Street elevated line through the South End and Roxbury.
- Harvard-Alewife Extension. This extension to Alewife Brook Parkway near the Cambridge-Arlington-Belmont lines would provide relief to congested Harvard Square and provide a superior highway-rapid transit interface location at the edge of densely-developed inner city neighborhoods in the northwest corridor of the region.
- Pines River Extension. An extension of the East Boston line to a junction with the proposed Revere Beach connector highway would provide improved access to public transportation for North Shore communities. Extensive parking facilities would encourage new passengers, as would a new fleet of air-conditioned, high performance rapid transit cars.
- South Shore Extension — South Braintree to Weymouth. Construction of this extension, or alternatively, to Holbrook, would fully capitalize on projected rider demand from fast-growing South Shore communities.

IMPROVING THE EXISTING SYSTEM

- Surface Car Lines and Central Subway Improvements. These include replacement of the streetcar fleet; track and roadbed improvements; an upgraded power distribution system, and an improved signal and communication system.
- Station Modernization. Additional stations to be modernized include Ashmont and Kendall on the Red Line; Haymarket, Essex and State on the Orange Line and State on the Blue Line.
- Consolidation of Bus Garages. As many as 12 existing bus garages would be consolidated into three garages, located in the Charlestown-Everett area, Arborway area and West Cambridge area to best serve present and anticipated future patterns of operation.
- Power Distribution Improvements. These include modernization of electrical sub-stations and minimum improvements to the existing South Boston and Lincoln generating stations.
- Other Plant Improvements. These include upgrading of engineering and maintenance facilities at Charlestown Yard and Everett Shops; building two auxiliary plant maintenance centers at outlying locations, and purchasing modern and more efficient machines and equipment.
- New Buses. To continue an orderly replacement program, the Authority proposes to purchase 200 buses in 1971 and 100 buses per year through 1975.

MISCELLANEOUS

- Railroad Commuter Improvements. On the assumption that railroad commuter service will continue on the North Shore, Lowell and Fitchburg lines, the Authority is proposing a reserve fund to provide more adequate parking and station facilities on these lines and for the purchase of selected available railroad rights-of-way.
- Technological Innovations. The Authority proposes to introduce transit vehicles that can utilize facilities financed from highway funds and are compatible with existing elements of the transit system and do not contribute unduly to air pollution. Such vehicles could include jitney service, demand-actuated buses, dual mode vehicles and dual propulsion vehicles.

URBAN POTPOURRI

- The first of the new "Metropolitan" cars built especially for the line have gone into service on the Harlem Division of the Penn Central out of New York. By the end of September, the new equipment will be operating on 29 daily Harlem line trips. Eighty cars were ordered for the line, but they could not be placed in service until some platforms were raised. 48 more Metropolitans are scheduled to be delivered beginning late this year, releasing enough older reconditioned cars to provide all air-conditioned service on the Hudson line as well.
- Given the militant character of some New York area transit consumer groups, it is not surprising that the TA's plans for the new Second Avenue subway have come in for considerable flak. Biggest criticism of the line is that it will have but two tracks instead of the four the groups contend are necessary for safe and fast operation. Second in line come complaints about the inadequacy of the stations planned for the line in the 34th-126th Street segment: 34th, 48th, 57th, 72nd, 86th, 106th and 125th Street; the groups contend that a stop at 96th Street also ought to be included, as well as a rearrangement of the other stations. The \$371,-000,000 project is expected to begin next summer and take three or four years to complete; trains should be running on the 34th-126th segment by 1978.
- Some twenty-odd Illinois Central HighLiner cars are on the property now out of an order for 130, and no less than three have already been involved in accidents; car 1508, for example, hit the concrete platform at Randolph Street the other day, and will probably require a completely-new front end, while two other units involved in crew training collided head on last week.
- Flixible has won a contract to supply the Massachusetts Bay Transportation Authority with 300 buses, for a total of \$11,400,000. The order involves 250 conventional transit units plus 50 for turnpike express service; all are to be delivered by June 1972.
- Starting October 18, Adelphi University will teach graduate courses in business administration aboard "commuting classrooms" attached to a regularly-scheduled LIR train leaving Port Jefferson each day at 5:56 AM. Regular classes will begin after the train leaves Huntington Station enroute to its Hunters Point terminal. An additional set of courses will be offered on a companion eastbound run at night; the for-credit program will be offered in a reconditioned parlor car built forty years ago for the Boston-Albany run.
- Texas ERA's SHORT CIRCUIT BULLETIN notes that the last of Copenhagen's tram lines, #5, will be converted to motor buses late next year. Only the older cars are still in service on the shrunken system, the DuWags having been sold "south of the border" last year.
- In response to a reader's question, NCL subsidiary National City Management operates the public systems in Miami, Waterloo-Cedar Falls, Providence, Rochester, Schenectady, Spokane and Yakima. National City Lines itself still operates service in Mobile, Montgomery, San Jose, Tampa, Decatur (IL), Rock Island-Moline, Davenport, Lincoln (NB), Beaumont, El Paso-Juarez, Houston and Wichita Falls (TX). City Coach Lines owns outright the systems in Jacksonville, Grand Rapids (operated under contract to the Grand Rapids Transit Authority), Charlotte, Greenville (SC), Raleigh, the City Cab Company of Grand Rapids, TRANSCO, Inc., and the Greenville Charter Coach Company (set up as a hedge against GCCL municipalization).

Dick Nolan

(SAN FRANCISCO EXAMINER)

Wrong Way Subway

When bids for the proposed Muni subway car came in at well over \$500,000 per unit — impossibly expensive — it was once again reassessment time in the local transit works.

The ridiculous bids were a delayed legacy from the managerial efforts of James K. Carr, who was not removed as Manager of Utilities quite in time to avoid the disaster.

Carr it was, under the genial patronage of Mayor Joe Alioto, who thrice changed his mind about the Muni subway car design, escalating his dreams each time, and concluding at last with the super-customized \$500,000 model no transit system on earth can afford, and which, more to the point, not even our open handed Federal government is willing to help underwrite.

So it's back to the drawing board. But so far no indication that it's quite far enough. I shall explain.

★ ★ ★

THE MASTER error of the Carr regime, insofar as the Market Street subway is concerned, was to settle for a stub end terminus at the Embarcadero end of the subway system.

The better arrangement, as any transit man in the nation will tell you (except, possibly, our home grown Muni mumbblers) would have been a turn-around loop.

None of this sounds very serious, but it is. With the stub method you are immediately faced with certain operational stringencies. You must have controls at both ends of whatever car you operate, and that's both clumsy and expensive. You can't feed the vehicles back into service quite as fast. You have to have doors on both sides of the car, and that's expensive.

With a loop turnaround you can maintain somewhat tighter headways — run your cars closer together. You can avoid the inevitable traffic jams at track's end. It's a smoother and faster operation all around.

But it takes real estate. Somebody's real estate got saved with the loop abandoned and the stub end adopted. The money saved by not building the loop has gone up in inflation anyway, and many times that amount will be lost in operating snarls yet to come.

It's still not too late, possibly. Perhaps some \$7 million would set this turnaround

matter to rights, at last. Thus, as it happens, could save a lot of money in the new rolling stock. As a matter of fact, with a turnaround loop it would be technically possible to run our present single-end PCC street cars in the subway, and how do you like them apples?

In any case with a loop turnaround method, the redesigned Muni cars could be built a lot more simply and thus a lot more cheaply. Just the single-end controls and one-side doors would be a saving. But more than that, we could use much less elaborate cars — perhaps even a relatively simple modification of the streetcars we already have!

★ ★ ★

ONE OF the forgotten facts about transit here is that Muni never did realize the potential of our present streetcars, which have always been operated in San Francisco on a track system that does not suit them.

The PCC streetcar can go a hell of a lot faster than they have ever gone here, if the trackage is suitable and the signal system is up to date. It is also possible to run the PCC streetcar in trains as other cities operate them, and in fairly high-capacity subways.

One of the troubles of the design problem, as Muni finally set about drawing the specs for a custom car, was the necessity for meeting the transit loads already carried by the streetcars on our main lines! It was scarcely a matter of vastly outperforming our old streetcars: the problem was to design a car and a system that could do as well as the streetcars have been doing.

Muni is already years behind schedule in its subway planning and design, so there is little point in worrying now. I suppose, about the further delay that \$500,000-per-car low bid has caused.

★ ★ ★

I AM ALMOST tempted to say the \$500,000 bid was a blessing, if it gives us another shot at redesigning the lower end of the subway to provide a turn-around loop, thus freeing the car designers to save important money both in capital cost and future operating expenses.

But I resist the temptation. Alioto & Company have scarcely made a right move yet, and it is a bit much to expect them to do so now.

AIRLINE ACTION



"Feature movies aren't enough. We've got to start showing 'em serials to insure they come back again and again."

times; travelers would have to be away at least 14 days and no more than 45. The lowest current fare is \$372 in summer and \$312 in the off season, under the old 29-to-45-day excursion plan.

Lufthansa's new fare plan (which is expected to be at least copied by the other carriers flying the North Atlantic, if not undercut) sketches out this way:

	CURRENT FARE	LUFTHANSA FARE
REGULAR ECONOMY--OFF PEAK	\$536	\$420
REGULAR ECONOMY--HIGH SEASON	\$636	\$540
EXCURSION-BASIC/17-28 DAYS	\$382	14-45 DAYS \$210
EXCURSION-BASIC/29-45 DAYS	\$312	14-45 DAYS \$210
EXCURSION-HIGH/17-28 DAYS	\$442	14-45 DAYS \$270
EXCURSION-HIGH/29-45 DAYS	\$372	14-45 DAYS \$270
GROUP INCLUSIVE TOUR-BASIC	\$277	7-21 DAYS \$180
GROUP INCLUSIVE TOUR-HIGH	\$342	14-45 DAYS \$270
AFFINITY GROUP-BASIC	\$207	ELIMINATED
AFFINITY GROUP-SHOULDER	\$237	ELIMINATED
AFFINITY GROUP-HIGH	\$297	ELIMINATED
YOUTH FARE-BASIC	\$210	\$195
YOUTH FARE-HIGH	\$228	\$240

(High Season comprises generally the Summer months--June, July, August, September; Basic or off-peak the Spring, Fall and Winter months; Shoulder certain periods immediately before and after the high season; dates vary with each year).

Apparently a price war over the North Atlantic next year is a certainty.

A HOLE IN THE DIKE

■ As expected, Lufthansa has refused to reconsider its rejection of IATA's price-fixing agreement on fares and announced its own tariffs for North Atlantic travel to become effective February 1, 1972; all other airlines will be able to do the same in terms of tariffs now that the hoped-for unanimous agreement (required by the IATA charter in order for fare packages to become effective) has not been achieved.

Lufthansa will introduce on that date the lowest trans-Atlantic rates ever offered on scheduled flights, including a round-trip excursion fare from New York to any city in West Germany of \$270 in summer and \$210 at other

JET JOTTINGS

■ The Department of Transportation has notified Governors and state and local agencies of funds available to them under the \$280,000,000 airport development program for the current fiscal year; the funds will be available to commercial and general aviation fields...■United president Edward Carlson has said that the industry should adopt an "airline cost of living index" for use in adjusting fare levels...■Aeroflot is soon to establish round-trip service on a London-Moscow-Tashkent-Singapore-Hong Kong-Tokyo route. The Soviet-flag carrier also plans to expand service to Australia, New Zealand, South America and Africa...■The state-owned Chilean airline, LAN-Chile, may purchase three Ilyushin IL-62 jets; the Soviet-built craft is similar to at Boeing 707.

RAILWAY REPORT

WIDENING THE CORRIDOR

■ DOT, in a major policy reversal, said last week that high-speed passenger train service offered the only hope of relieving congestion, pollution and delay in the heavily-traveled Northeast Corridor for the 1970's. The DOT report, which discounted the possibility of any major expansion of air or highway facilities (including taking issue with the need for a fourth jetport in the New York metropolitan area), was the culmination of five years of study. It urged the prompt investment of \$500,000,000 in Federal, state and local funds toward improvement of existing rail links in the Corridor, the urban area stretching from Boston southward to Washington.

The report recommended \$160,000,000 of improvements in the Corridor's highway system, including a few new road sections and a warning system that would guide drivers away from bottlenecks. It also proposed an intensive study of exotica for the Corridor, ranging from 300 mile-an-hour air cushion trains to VTOL craft.

But the major emphasis of the report was placed on the long-neglected passenger train as the only solution to the problem of mobility in the highly-urbanized area. It also directed the thinking of the Department toward cures for today's problems with present technology, as against looking forward to what will be available in 1985. In a news conference outlining the report, Transportation Secretary Volpe noted that technological breakthroughs, including the air-cushion train, were at best a decade away, and that solutions with materials at hand ought to be employed to solve the problems facing us in 1971. He also debunked the myth that highway expansion would solve the mobility crisis facing the Corridor.

According to the Secretary, the investment of \$390,000,000 in new equipment for AMTRAK and upgraded track would make possible within three years a two-hour trip over the 225 miles separating New York and Washington via the Penn Central, and a 2:45 trip along the equivalent distance between New York and Boston. The fastest New York-Washington MetroLiner now requires 3:00; the fastest New York-Boston TurboTrain requires 3:50. Conventionally-equipped trains on the two routes, as might be expected, require a great deal longer to complete their trips.

THE COVER: The latest entry in the small bus sweepstakes, the Mercedes. Several are already in service on "minibus" routes in various parts of the country.

FIRST PERSON

(EDITOR'S NOTE: This is the first in an experimental series of informal glimpses of public transportation as it is in the 1970's, in this country and abroad. Our initial installment is written by the Chicago-based Raymond DeGroot Jr., a world traveler of some renown who has almost literally circled the globe for the better part of two decades on "fact-finding" trips to major transportation centers. Mr. DeGroot's commentaries will appear in these columns on an irregular basis contingent on reader response.)

The major reference work for this trip was the book, "Europe's Greatest Tramway Network," by F. Van der Gragt. Detailing the famous Rhein/Ruhr tramway network, it is written in English by a Dutchman and is a "must" for any visit to this area. It contains maps, route lists, equipment rosters, historical outlines and pictures. Earl Clark's "List of World Tramways" should be consulted for its wealth of statistical information; some notes in this report are taken from the new 1971 issue.

The German tram systems visited have a number of things in common. The livery is usually cream with different colored stripes differentiating the various owners (Dortmund is a classic exception). All cars have pantographs. Track is usually in fine shape and good speeds are maintained between the stops which are generally spaced far apart. Trams run on long headways, but timetables are always available. Increasing costs and staff shortages have resulted in one-man operation in most cities with various (and varied) automatic and semi-automatic fare collection systems. Self-cancelling ticket machines are prominently located in vehicles and passengers buy their tickets from machines or nearby stores (generally at a slight reduction) before boarding cars. They then cancel their tickets on boarding; a heavy fine can be levied by an inspector if he finds a passenger without a properly-cancelled valid ticket. A wide variety of passes are also employed. Some cars (notably the older motorcar of a two- or three-car train) are reserved strictly for pass holders thereby eliminating the expense of ticket machines. Conductors may be in one or both trailers, or else the honor system prevails. The fare systems differ enough between cities that it takes the overseas visitor a while to figure out just exactly what to do on each system, and some systems print instructions in four languages to assist tourists and immigrant workers. The Dutch systems also have gone in for various forms of self-cancelling tickets and machines. But there is a special 3-day Holland provinces rover ticket available for 35 Florins (approximately US\$ 10.00) good for unlimited travel on the Netherlands Railways, the three trams systems and suburban bus lines. It saves much time and is extremely convenient, even if you have to convince a tram driver on occasion of its validity (they are not seen that frequently on trams).

KÖLN-BONN: The first city visited was Köln (Cologne) (760,000). It is a progressive city with a truly magnificent network of trams operated by the Kölner Verkehrsbetriebe (KVB). Almost entirely equipped with radio-equipped DuWag articulated cars, the system must rank with Göteborg, Sweden, as one of the most modern in the world. The inner city portions of the routes are now in tram subways, and more are being built, while outer areas are served by long lines on private right-of-way. The cars are operated by one man, and the extensive use of self cancel-

ling ticket machines speeds loading. Good speeds are achieved on the standard-gauge track.

Connecting Cologne with Bonn is the standard-gauge Köln-Bonner Eisenbahnen (KBE), Europe's highest-speed interurban railway. There are two routes to Bonn, the Rheinuferbahn which parallels the Rhein for a large portion of the 28 kms., and the Vorgebirgsbahn, which runs on a more inland route of 32 kms. While both routes share a Bonn terminal, the Rheinuferbahn starts in the center of Cologne just north of the famous Hohenzollern railway bridge across the Rhein, and the Vorgebirgsbahn starts in a modern terminal at Barbarossaplatz easily reached by tram subway from the city center. Running time for express trains on the Rheinuferbahn is 30 minutes, locals 51 minutes. Vorgebirgsbahn trains take 62 minutes between terminals. Headways range from 30 to 60 minutes with extras added in the rush hours. Cars are painted maroon with cream trim, except for the 200-series "Silver Arrow" cars which are silver with red trim. The line is operated as a railway and is extremely efficient.

Bonn (120,000) is the capital of the German Federal Republic. The standard-gauge Bonner Verkehrsbetriebe (BVB) operates the two city lines (routes 1 and 2), the 10.5 km suburban line to Bad Godesberg and Mehlem (now route 3), the 10 km interurban to Siegburg (route S) and the 16 km interurban to Bad Honnef (route H). It is possible to ride line 3 on the west side of the Rhein to Mehlem, cross the Rhein on a ferry to Königswinter, and return on the east side line H to Bonn, a delightful round trip for which a special 2 mark ticket is available. The city car fleet consists of single-end double-truck and six-axle articulateds dating from 1957-60, some double-truck trailers, and a number of double-end three-axle motor-and-trailer cars for line 3, and 8-axle double-end articulateds for lines S and H. A subway is currently being built for both the KBE and BVB lines.

One more line to see in the Bonn area is the 1.5 km Drachenfelsbahn, an electric meter-gauge rack railway operated by the Bergbahnen im Siegenbirge with gradients up to 20% which ascend the Drachenfels (Dragon's Head) promontory from which there are beautiful views up and down the Rhein. Opened as a steam railway in 1833, it was electrified in 1953, but steam service did not end until after a serious accident in 1958. A former steam locomotive is on view near the lower station on the line which is several blocks walk from interurban line H and the ferry terminal.

WUPPERTAL -- No visit to this area is complete without riding the world-famous Wuppertaler Schwebebahn or suspension railway which opened March 1, 1901. The 13.3 km route between Oberbarmen and Vohwinkel follows the course of the Wupper River except for about a mile in Vohwinkel where it is built over a street. Headways are close, and the journey takes 30 minutes with 17 intermediate stations. Some cars date back to the beginning of the line, but others were built new in 1950 and 1951; four of these were rebuilt into articulated cars between 1962 and 1965. The cars are not particularly fast; indeed the paralleling trams on wide, straight streets built after the war can equal the Schwebebahn in some areas. But the sight of a train approaching suspended from what resembles a conventional elevated structure is something to see. It is a strange and unique rapid transit line, to say the least.

Wuppertal (375,000) is the collective name for a group of cities strung out along the Wupper River--Vohwinkel, Elberfeld and Barmen, 16 miles east of Cologne. These are in a district famed for its beauty, but often misunderstood by many to

be a grim industrial area. Wuppertal even now must have the greatest variety of forms of transport in the world. In addition to the Schwebebahn, there are standard-gauge trams, trolley buses, motor buses, main and suburban lines of the German Federal Railways, and until recently narrow-gauge trams and a rack tramway. Although developed independently, the city transit was merged into the Wuppertaler Stadtwerke in 1940. Today, there are 4 tram lines and one trolley bus route. The trams generally parallel the Schwebebahn in the narrow Wupper Valley since the long lines into the hills have been abandoned. However, there are several long stretches to the east and west of the suspended railway. Basic service is provided by 8-axle single-end articulateds dating from 1954-55 and 1960, and double-end "2 rooms and a bath" articulateds of 1961.

I visited Wuppertal accompanied by Fritz Kegel of Köln; enroute we drove along the former narrow-gauge tram route 5 which connected Wuppertal over the hills to Solingen. On a portion of this route the Bergische Strassenbahn Museum hopes to start operations in 1972 using the former Wupper and other cars from its collection. We also stopped briefly in Solingen, which is a major trolley bus center (possibly the "Dayton" of West Germany), with many new units in service.

DÜSSELDORF-NEUSS-KREFELD -- Düsseldorf, the capital of the industrial province of North Rhine-Westphalia, is a modern city of 600,000 located 25 miles north of Cologne. The city is served by the Rheinische Bahn Gesellschaft, founded in 1896, and popularly known as the Rheinbahn. The city system, standard gauge, is served by a wide variety of cream with grey stripe 6- and 8-axle single-end articulated cars, and some modern, double-truck cars, but older four-wheel cars appear in the rush hours, usually in two- and three-car trains. An intensive service is worked on some 14 city routes, and extra cars are added in the rush hours. Two interesting lines are 16/26, the almost circular routes connecting the main Düsseldorf railway station with Neuss (70,000) across the Rhine river. Neuss itself has one remaining city route operated by Stadtwerke Neuss on tracks partly shared with 16/26; the line was expected to close in August, 1971. Equipment consists of a variety of older four-wheel cars, double-truck double-end DuWags, and double- and single-end 6-axle articulated Duwags (the single-end articulateds are for Neuss' contribution to the 16/26 fleet). When the Neuss system closes, lines 16/26 will remain and will be worked by the Rheinbahn, which will take over the better Neuss cars and add them to its system.

In addition to the city lines, the Rheinbahn operates two interurban express tram lines, Line K to Krefeld and Line D to Duisburg. The former is 21 km long and mostly on private right-of-way; running time is 42 minutes. Special 8-axle double-articulated double-end cars were developed for this operation. Two-motor trams were connected by a new middle section, and so a new four-truck version of the "two rooms and a bath" car developed; the color scheme is cream with a red stripe. The other interurban, line D, is famous for its refreshment car service, introduced in 1959. The cars are mainly 6-axle, single-end articulateds also painted cream with a red stripe. They cover the 25 km between Düsseldorf and Duisburg in 48 minutes. Much of the route is on private right-of-way which is being upgraded to form the first part of the planned Stadtbahn network of rapid transit lines in the Ruhr area.

Krefeld (180,000) has a small, meter-gauge system of four routes using some 50 motor cars and 35 trailers operated by the Krefelder Verkehrs. Most operations are on city streets, but route 4 to Hüls has an excellent center reservation and there are other stretches of private right-of-way. Route 3 goes to Uerdingen,

site of one of the DuWag car construction plants. A new line is currently under construction.

DUISBURG AND THE RUHR TRAM NETWORK -- Duisburg is located at the western edge of the famous Ruhr industrial area which comprises the other major cities of Oberhausen, Mülheim/Ruhr, Essen, Bochum, Gelsenkirchen, Recklinghausen and Dortmund, and the smaller cities of Ruhrort, Hamborn, Dinslaken, Bottrop, Gladbeck, Buer, Herten, Witten and Herne; more than 3,000,000 people live and work in this area. All cities except Dortmund and Oberhausen are connected by a vast tram network. Oberhausen closed its trams, and the connection between Dortmund and Bochum has been broken. The weaker, often single-track lines in the more lightly-populated areas have been closed, but there is still a large number of tram lines running, many jointly worked by two systems, and many will be upgraded to light rapid transit in the near future. Everything except Duisburg and Dortmund is meter gauge. The bulk of the equipment is DuWag articulated cars in various configurations, but some older types of cars still see service in the more remote areas. Fifteen and 30-minute headways are generally scheduled, and the cars are usually cream with different color stripes differentiating between the separate city ownership. The Mülheim/Ruhr cars are very bright in their ivory color with green trim.

The system operated by Duisberger Verkehrs Gesellschaft is now all standard gauge, the meter gauge routes either having been abandoned or upgraded to standard. There are currently six routes plus the joint working of line D to Düsseldorf. Several are short city routes, but line 9 is 28 km long and takes 81 minutes to cover from the south terminal at Huckingen (on line D) to the northern end at Dinslaken. Duisburg is known for its various models of home-built articulated cars.

HAGEN AND DORTMUND -- Hagen (150,000) is 32 miles east of Düsseldorf, and while not strictly a part of the Ruhr area is an industrial city in its own right. Tram service is provided by Hagener Strassenbahn over several meter-gauge routes. Base service is handled by 7 double-end double-truck DuWag cars built in 1957-58 or 16 6-axle double-end DuWag articulateds built from 1959 through 1967. All are painted cream with green stripe.

Dortmund (510,000) was far more interesting not only because of the several varieties of cars, but the beautiful brown color scheme was certainly different from anything I had seen until then. Dortmund is some 10 miles north of Hagen at the eastern end of the Ruhr area, although no longer connected by tram to the rest of the network. Nevertheless, the standard-gauge system is fairly extensive with some fine portions of private right-of-way. The basic car type is an 8-axle double-end articulated built variously between 1959 and 1968, but there are some single-end "two rooms and a bath" units built in the late 1950's, six single-end double-truck cars with 6 matching trailers, and a number of older car types.

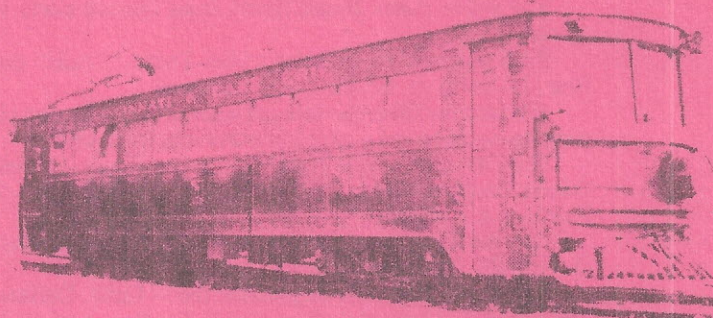
THE NETHERLANDS -- The three Dutch tram cities--Amsterdam (800,000), The Hague (607,000) and Rotterdam (900,000)--offer a great variety of scenery and car types. The Gemeentevervoerbedrijf Amsterdam (GVB for short) operates 13 urban services over a standard-gauge network which includes a large section of limited tramway to the community of Osdorp. Six- and 8-axle articulated cars of a special design are used almost exclusively; one or two old cars come out for a very brief period in the rush hours. The articulateds have a huge destination indicator and are painted grey; however, several are now appearing in a bright yellow with a new company emblem; older cars are still painted blue and grey.

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