Inside: Bus Route Numbering Update (1)
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Long Journey & Push-Pull

Letter from Ian Manning *on two items in The Times of September 2020*

Two short comments:

1. **Geoff Mann** was surely right about the attractions of riding 'round NSW by CPH. When I took the rail motor and matching trailer from Stockinbingal to Parkes on Sat 12.9.70 there was an unscheduled stop in a belt of sandy country south of the Lachlan, for the guard to check his rabbit traps. Similarly, I can recall the Tumbarumba CPH stopping in a paddock so that both crew and passengers could pick mushrooms.

2. The context for **James Wells'** article on Indian push-pull trains is that when the British pulled out of India in 1947 they left EMUs but no rail motors apart, I think, from the car on the Kalka-Simla. As a conservative organisation, IR stuck with loco-hauled trains, standardising for decades on Alcos. The ComEng railcars which Australia gave them in the 1960s had no impact at all. However, the operational benefits of not having to run round eventually led to top and tail operations and also to control trailers - I have indeed travelled, I think on the Hasnabad branch, on a train where the WDM3A was in the middle of two driving-trailer sets. From the 1990s on, India has tried to build DMUs, but they were unreliable and for years it was usual for the DMU set to turn up with a WDM3 providing the power. In January this year, however, I travelled on the Siliguri - Dhubri DMU which I thought might at last be a reliable design and help to do away with the push-pull trains.

Our Cover Clock

This month, our "Cover Clock" is the Boston Customs House clock. The Boston Tea Party took place nearby, at the foot of Pearl St.

Bus Route Numbering Update *Part 1 – New South Wales, Victoria, Queensland and Western Australia*

Hilaire Fraser

I**N 2007 AND 2012, I WROTE** articles for "The Times" on bus route numbering systems. Because route numbering systems do not remain the same, it is time to do an update.

In my previous articles, descriptions of bus route numbering systems were split between urban and rural cities. As many states now have state-wide numbering systems, I will report state by state. Part one covers New South Wales, Victoria, Queensland and Western Australia. Part two will cover South Australia, Tasmania, Australian Capital Territory, North Territory and New Zealand. Much of this part covers NSW as I have used NSW to demonstrate route numbering systems and Sydney has had many changes recently. Details are current as at October 2020.

Many cities and states now use what I call the "RSI" system of bus route numbering, where "R" the first digit stands for a region within the city or state, "S" the second digit stands for a sub-region and "I" the third digit indicates a particular variation in the sub-region.

New South Wales

Sydney uses B, F, L, M and T prefixes to designate bus, ferry, light rail, metro and train routes respectively.

However, only one bus route B1 City-Wynyard to Mona Vale uses this designation. In general Sydney numbers are allocated to regions as follows:-

- 100 series Northern Beaches
- 200 series Lower North Shore
- 300 series Eastern Suburbs
- 400 series Inner West
- 500 series Victoria Rd Services and Upper North Shore
- 600 series North of Parramatta
- 700 series West of Parramatta
- 800 series South of Parramatta
- 900 series Liverpool to Bankstown to Sutherland Shire

As an example of route numbering for

sub-regions, the 240 series is used for North Shore services proceeding along Military Rd from City-Wynyard as follows:-

- 243 Wynyard—Spit Junction via North Cremorne
- 244 Wynyard—Chowder Bay
- 245 Wynyard—Balmoral
- 246 Wynyard—Spit Junction/ Balmoral Heights
- 247 Wynyard—Mosman Junction/ Taronga Zoo
- 248 Seaforth—Wynyard (inwards only)
- 249 Wynyard—Beauty Point

There is an ongoing simplification of "L" (Limited Stop) and "E" and "X" (Express) prefixes which are used on the current and former State Transit routes.

For example, 309X Railway Sq-Port Botany replaces X09 Railway-Banksmeadow and L09 Redfern-Port Botany and 310X Railway Sq-Banksmeadow via East Botany replaces X10 Railway Sq-Eastgardens.

The "E" prefix was used for Northern Beaches Express Services and the "X" prefix was used for rest of the network. On 3 May 2020, all Northern

Buses Express routes E50 to E89 were renumbered 150X to 189X and Limited Stop L90 renumbered 190X. Thus E70 City-Manly became 170X and L90 City-Palm Beach became 190X. Full details are contained in Norbet Genci's article "Impact of four-digit bus route numbers for Sydney northern beaches bus services" published in the July/August 2020 edition of "*Australian Bus*".

The Hillsbus network serving Sydney's North-West uses the X suffix for all day services connecting the north-west with the City. Examples are 607X City-Bella Vista and 615X City-North Kellyville. Originally the "X" suffix indicated services which ran through the Lane Cove tunnel, thus 614 City-Crestwood became 614X when operating via the tunnel in lieu of Lane Cove Shopping Centre.

Progressively the "M" prefix is being removed from the Metrobus high-frequency network as follows:-

- 320 Gore Hill-Mascot (previously M20)

- 340 Chatswood-Bondi Junction (previously M40)

- 410 Hurstville-Macquarie Park (previously M41)

- 430 Mosman-Taronga Zoo (previously M30)

- 550 Parramatta-Macquarie Park (previously M54)

- 600 Parramatta-Hornsby (previously M60)

- 610X Railway Square-Castle Hill (previously M61)

M10 Leichhardt-Maroubra Junction and M50 Drummoyne-Coogee were withdrawn on 25 October 2020 and replaced by light rail services and local bus routes. M52 Circular Quay-Parramatta, M90 Liverpool-Burwood, M91 Parramatta-Hurstville and M92 Parramatta-Sutherland continue to operate.

Because the "M" prefix is being removed from bus services to designate Metro train services, the "T" is being removed from transitway bus services to designate train services. This is in conjunction with the re-organisation of bus services brought about by the opening of the North-West metro bus routes from Parramatta have been renumbered from T60-T66 to 660-665, T66 having no direct replacement and T70-T75 from Blacktown have been renumbered 730-735. T80 Parramatta-Liverpool continues.

Sydney has a number of "S" services for "Shopper Hoppers". However, the "S" prefixes are progressively being used for school services across the state and it is expected that shoppers' services will be renumbered. Already S8 Wentworthville-Constitution Hill has been renumbered 709.

The letter "N" is used as a suffix to indicate a night service for an existing bus route e.g. 400 Bondi Junction-Sydney Airport Limited Stops becomes 400N Bondi Junction-Eastgardens All Stops as a night service. "N" is also used as a prefix for the Nightride rail replacement services which operate in the early morning e.g. N10 City Town Hall-Sutherland, N11 City-Town Hall-Cronulla.

Outside Sydney a second series of route numbers is in operation as follows:-

- 1 to 99 Wollongong
- 100 to 139 South Coast (Kiama & Nowra Regions)
- 130 to 199 Port Stephens & Maitland Regions (130 to 139 overlap both regions)
- 260 to 299 Outer Newcastle (West Wallsend, Toronto & Morisset)
- 300 series Mid North Coast
- 400 series New England & North West
- 500 series Western
- 600 series Far North Coast
- 700 series Far South Coast
- 800 series Southern Tablelands
- 900 series Riverina

For example, as you proceed along the Pacific Highway from Newcastle you will find the 300 series further allocated as follows:-
- 300 series Forster
- 310 series Taree
- 320 series Port Macquarie Town
- 330 series Port Macquarie Rural
- 340 series Kempsey Town
- 350 series Kempsey Rural & Nambucca Valley
- 360 series Bellinger Valley & Coffs Harbour
- 370 series Grafton
- 380 series Yamba

Specifically Busways routes detailed in the Coffs Harbour and Southern Areas timetable are:-
- 351 Macksville-Bowraville via Rodeo Drive (previously 357R)
- 352 Macksville-Bowraville via Wilson Rd (previously 357W)
- 356 Macksville-Scotts Head & Grassy Head
- 357 Mylestom-Bellingen (previously 359B)
- 358 Macksville-Bellingen via Nambucca Heads
- 359 Urunga-Bonville
- 360 Coffs Harbour-Macksville (previously 360M)
- 361 Coffs Harbour-Bellingen
- 365 Park Beach Plaza-Park Av via The Jetty
- 366 Park Beach Plaza-Park Av via Frances St
- 367 Park Beach Plaza-Park Av via Donn Patterson Dr
- 368 Park Beach Plaza-Park Av via Pearce Dr
- 369 Park Beach Plaza-Park Av via Pacific Hwy (previously 360)

Newcastle Transport bus services have two digit route numbers as follows:-
- 11 to 14 Frequent Routes
- 21 to 29 Standard Routes
- 41 to 48 Tailored Routes (no service after 6pm)
- 55N Stockton Night Service
- D59 Charlestown Region On Demand Service

The NSW Central Coast Region also uses route numbers in the 1-99 series. Busabout Camden rural services are numbered 31 to 49.

Although under the state-wide system 500-508 were allocated to the Lithgow town services and 510 to the Lithgow-Portland service, the Lithgow bus routes have their own unique numbering system i.e.
- 100 Lithgow-Littleton & Lithgow Hospital
- 101 Lithgow-Bowenfels
- 200 Lithgow-Barrs & Tweed
- 304 Lithgow-McKellars Park & Oakey Park
- 500 Lithgow-Vale of Clywdd
- 600 Lithgow-Portland
- 636 Lithgow-Bathurst

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Victoria

In Melbourne, route numbers are allocated to regions as follows:-
- 1-109 Tram Routes
- 150-192 Werribee
- 200-295, 302-318, 350, 364, 370, 380 Footscray & Doncaster (i.e. former government bus routes)
- 301, 343, 356-358, 381-389 Outer Northern
- 400 series Western
- 500 series Inner Northern
- 600 series Eastern
- 700 series Knox City/Bayside
- 800 series Dandenong
- 900, 922-929 Rowville-Caulfield, St Kilda & Pakenham
- 901-903 Orbital Routes
- 905-908 DART (Doncaster Area Rapid Transit) Services
- 941-982 Night Bus

Of interest, 3 City-East Malvern weekend tram services deviating through St Kilda become 3a.

As Victoria Regional Centres have grown sequential 1, 2, 3 ,4 etc. bus route numbering systems have been

replaced by more elaborate two digit systems.

Geelong routes are numbered 1 North Shore-Deakin University, 10-12 Lara, 20-25 North Geelong, 30-32 East Geelong, 40-49 South Geelong, 50-61 Bellarine Peninsula

Ballarat routes are numbered 10-15 North Ballarat, 20-26 South Ballarat, 30-31 Creswick & Miners Rest

Bendigo routes are numbered 5 Kangaroo Flat-Huntly, 50-55 West Bendigo, 60-65 East Bendigo, 70 Strathfieldsaye

Latrobe Valley routes are numbered 1-9 Traralgon-Morwell-Moe Trunk Services, 11-15 Moe Town Services, 20-22 Morwell Town Services, 30 Churchill Town Service, 40-45 Traralgon Town Services

Warragul & Drouin have routes numbered 81 to 89.

Horsham has routes numbered sequentially in this case 1-5, as do many smaller centres.

CDC Mildura uses the "Lithgow System" with route numbers allocated as follows:-
- 100 Mildura-Red Cliffs (outward)
- 200/211/250 Red Cliffs/Merbein-Mildura (inward)
- 300/311/312 Mildura-Merbein (outward)
- 400/401 Mildura-Mildura East
- 500/501 Mildura-Mildura West
- 600/601/602 Mildura-Aerodrome Ovals & Mildura South

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Queensland

In South-East Queensland, numbers are allocated to regions as follows:-
- 27 to 77 Inner Brisbane Services
- 100 series Brisbane South
- 200 series Brisbane East & Redlands
- 300 series Brisbane North
- 400 series Brisbane West
- 500 series Ipswich Logan City
- 600 series Outer Brisbane North & Sunshine Coast
- 700 series Gold Coast

A "P" prefix is used for pre-paid services such as P129 City-Algester Rocket, P201 City-Carindale Heights Rocket and P331 City-Bracken Ridge Rocket.

Outside South-East Queensland, a second series of route numbers is in operation as follows:-
- 100 series Cairns
- 200 series Townsville
- 300 series Mackay
- 400 series Rockhampton
- 500 series Gladstone
- 700 series Maryborough & Hervey Bay
- 801-805 Innisfail
- 841-844 Bowen
- 880-881 North Stradbroke Island
- 890-891 Sunshine Coast Hinterland
- 895 Kilcoy to Caboolture
- 900 series Toowoomba

Bundaberg has routes numbered sequentially 1-6. However, these are likely to be renumbered in the 600 series. Young's Bus Service routes along the Capricorn Coast are

currently numbered 20 to 29. These are likely to be renumbered 420 to 429 in the Rockhampton series. Gympie bus services currently numbered 1 to 9, 50 and Warwick bus services currently numbered 1A, 1B, 2, 3, 4 are likely to be renumbered in the 800 series.

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Western Australia

Western Australia has developed a state-wide route numbering system as follows:-
- 1-99 Central Perth
- 100 series Western Perth & Fremantle
- 200 series South-East Perth
- 300 series Eastern Perth
- 400 series Northern Perth
- 500 series Southern Perth
- 600-604 Mandurah-Pinjarra
- 650-659 Optus Stadium Perth Special Events
- 673-676 NIB Stadium Perth Special Events
- 700 series School Services
- 800 Geraldton Circular
- 803-808 Albany
- 815-817 Busselton
- 825-845 Bunbury
- 850-856 Geraldton
- 861-866 Kalgoorlie
- 870-872 Port Headland
- 880-881 Karratha
- 900-909 Perth Ferry and Rail Replacement Services
- 910-990 Perth High Frequency Services

Part two will cover South Australia, Tasmania, Australian Capital Territory, Northern Territory and New Zealand.

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The Nevada Central Railroad Company– a Decidedly Different Timetable

Kent Hannah

THE NEVADA CENTRAL Railroad (NC) was one of the many now-storied mining railroads established in the desert state of Nevada in what just happened to be a richly-mineralized area. The NC was originally established as the Nevada Railway on March 25 1878 to build a narrow gauge (3 feet) railroad from Battle Mountain, NV on the Central Pacific to Austin, NV, south of Battle Mountain. The project was unable to obtain financing.

An employee of the Overland Stage Company at Jacobsville stage station (now a ghost town 7 miles west of Austin on the Reese River and the first county seat) used to ride into the hills in his spare time. He discovered the Reese River Mining District which was a silver mining area. The area sprouted a mining camp that turned into Austin, NV. In February 1875 Lander County, of which Austin was the county seat, was authorized to grant $200,000 in bonds to subsidize the construction of a railroad. The authority to issue the bonds lasted for five years.

On Sept. 15, 1879 the Nevada Railway sold its surveys and franchise to the Nevada **Central** Railway for $8,938.58. That set up the situation where if the new company intended to obtain the $200,000 in Lander County Bonds it had to build a 93 mile long railroad before the bond authority lapsed on Feb. 9, 1880.

Well, the typical "Perils of Pauline" situation developed such as rail shortages, labor shortages, laying track directly on ungraded frozen ground and others. It was rumored, but cannot be proven, that on the day before the bond authority was to lapse, Austin expanded its city limits to reach the end of track so that the bonds could be issued, Even with that helping hand, the railroad construction reached Austin at 1150 p. m., 10 minutes before the bond authority lapsed and the work completed by torchlight.

Well, mining camp railways were speculative in nature and traffic would nose dive when the mines played out. When the Carson and Colorado was built to the west in 1881 it syphoned a large of amount of traffic from the NC and the road never really recovered. At that moment, the Union Pacific came to the rescue and purchased the road for $450,000 in stocks and bonds to be part of the Salt Lake & Western, their effort to reach California via Central Nevada that never was built. A new management team (Charles Francis Adams) took over the UP and, because the NC had suffered from one of their numerous washouts, he decided to let the road go into default in 1885.

On Nov. 1, 1888 one Anson Phelps Stokes purchased the road out of receivership as the Nevada Central **Railroad**. In 1897 he sent his son to Austin to supervise his holding and built his boy the Stokes Tower west of Austin as his residence. The elder Stokes also controlled the Austin Mining Co. and mines in Ione and Downieville, NV. Mining in Austin ceased circa 1911. Although this part of Nevada is very much a desert, when it rains, it can wash out railroads and this was a continuing issue with the Reece River for the road. Another issue was the snow in the winter drifting in and closing down operations. Livestock started to make up a considerable amount of its traffic. The NC, as a 3 foot gauge line, had to transload freight to and from standard gauge cars at Battle Mountain. World War I saw an uptick in mining business and copper was the mineral.

On April 27, 1927 the NC started a bus line to carry passengers. Revenues were down to $25,000 per year. The winter of 1932 saw the road closed for 60 days due to snow. J. M. Hiskey, the General Manager, stated that if he could run steam trains daily, he could keep the road open, but they could not afford to do so. There was no revenue freight for the steam trains. The motor cars could not handle the snow. The snow issues occurred again in 1933.

David Myrick, a well-known author of railroad books about the region, reported that the road had 32 years of profitable operations and 25 years of losses. It never paid a dividend and never fully paid interest on its $750,000 in bonds in any year with no bond payments made after 1917. The Nevada Central Railroad was abandoned on January 31, 1938. I suspect the reason the bondholders were no hurry to press for payment was that all the rails and equipment were sold to a scrap dealer for $22,500.

I recently acquired on eBay the Nevada Central Railroad Time Card No. 44 (a working timetable) dated May 19, 1935. It is not in the best of condition but after reading the single sheet Mimeographed timetable, I thought it worth acquiring for its unusual rules.

Two trains were operated, No. 53 Southbound and No. 54 Northbound. Now at this stage, I suspect that both trains normally were a small motor car. Since they had a competing bus line which I suspect was faster, I

NEVADA CENTRAL RAILROAD.
J. M. HISKEY, Superintendent, Austin, Nev.

Train leaves **Battle Mountain**[1] ☒ *a*8 30 a.m. for Watts ☒ (36 miles), Silver Creek ☒ (70 miles), arriving Austin[2] ☒ (93 miles) 3 00 p.m. Returning, leaves Austin *b*9 00 a.m., arriving Battle Mountain 2 30 p.m.

a Tuesday, Thursday and Saturday ; *b* Wednesday, Friday and Sunday. ☒ Telegraph stations. *January* 1, 1908.

Connections.—[1] With Southern Pacific Co. for the east and west. [2] With stage lines diverging for Tonopah, Berlin, Belmont, Junction, Kingston and Midas. *Mountain time.*

THE NEVADA CENTRAL RAILROAD COMPANY

TIME CARD No. 44

Effective 12:01 A.M. Sunday, May 19th, 1935

South toward Austin Daily except Sunday		STATIONS AND SIDINGS	North toward Battle Mtn. Daily except Sunday	
No. 53 depart	Miles		Miles	No. 54 arrive
9:00 A.M.	0.0	BATTLE MOUNTAIN	92.3	1:40 P.M.
		10.9		
9:35 A.M.	10.9	Lewis	81.4	1:05 P.M.
		3.4		
9:46 A.M.	14.3	Dillon	78.0	12:54 P.M.
		4.9		
10:02 A.M.	19.2	Baileys	73.1	12:38 P.M.
		16.4		
10:54 A.M.	35.6	Watts	56.7	11:46 A.M.
		8.0		
11:20 A.M.	43.6	Bridges	48.7	11:20 A.M.
		6.0		
11:40 A.M.	49.6	Bobtown	42.7	11:00 A.M.
		3.7		
11:51 A.M.	53.3	Canyon	39.0	10:48 A.M.
		3.0		
12:01 P.M.	56.3	Walters	36.0	10:38 A.M.
		No siding at Walters		
		4.6		
12:16 P.M.	60.9	Ravauns	31.4	10:23 A.M.
		9.2		
12:46 P.M.	70.1	Silver Creek	22.2	9:53 A.M.
		4.6		
1:01 P.M.	74.7	Catons	17.6	9:38 A.M.
		11.5		
1:38 P.M.	86.2	Ledlie	6.1	9:00 A.M.
		6.1		
2:00 P.M.	92.3	AUSTIN	0.0	8:40 A.M.
Arrive				Depart

5 Hours 18.46 3.25	TIME OVER DIVISION MILES PER HOUR CALC. TIME MINUTES PER MILE	5 hours 18.46 3.25

No. 53 has right over No. 54 Battle Mountain to Bridges.
No. 54 has right over No. 53 Austin to Bridges.

Time Card rights and rules will prevail, whether service performed by steam train, or motor, EXCEPT: Steam trains will not exceed 16 miles per hour, and steam trains will observe time of departure from termini only, and will disregard time shown at intermediate stations.

All trains will carry passengers, mail, express and freight (up to capacity of equipment run). Where carload freight, or freight in excess of capacity of equipment is offered, same will be handled within such reasonable time as the general business of the carrier will permit.

Austin, Nevada,
May 15th, 1935.

J. M. Hiskey,
General Manager.

END

wonder how many people rode the train. I would guess that it handled mail, express and some less than carload shipments.

The unusual aspect of this timetable is the use of right over timetable instruction to set up a meet at Bridges. Every American railroad had issued their own rule books through the years. A great many of them, such as one issued by the Nevada Central are in the beyond hard to find category. All the rule books eventually were based on **The Standard Code of The American Railway Association-Train Rules-Block Signal Rules-Interlocking Rules**. I will use the January 1928 issue which was in effect during 1935. These rules books are rather massive as compared to what was issued by the individual railroads. The 1928 edition is 708 pages long. It

contains amendments and changes to the rules since they were adopted in 1887 and questions and answers. Things have changed, the last one with train order rules that I have seen was only 49 pages long and just reflected the current rules in effect.

I will speculate that in 1935 the Nevada Central did not have a train dispatcher (Rail Traffic Controller). A form "C" train order item 1 would read: "No. 53 has right over No. 54 Battle Mountain to Bridges." "This Order gives right to the train first-named over the other train between the points named". "If the trains meet at either of the designated points, the first named train must take the siding, unless the order otherwise prescribes". "Under (1), if the second named train reaches the point last named before the other arrives, it may proceed, keeping

clear of the opposing train as many minutes as such train was before required to clear it under the rules".

Now, an item 2 from C involves an extra train [a train not shown in the timetable]. "Extra 21 south has right over No 54 Battle Mountain to Bridges". "Under (2), the regular train [a train that IS shown in the timetable] must not go beyond the point last named until he extra train has arrived."

This form C rule was amended and adopted on Nov. 17, 1915. On Jan. 17, 1928 the form was changed to S-C. I might add that this train order was known as a form SC (single track right over), during my working career as a train dispatcher until the advent of track warrants and the extinction of train orders.

You will note the two lines on Time Card No 44 reading: No. 53 has right over No 54 Battle Mountain to Bridges. No. 54 has right over No. 53 Austin to Bridges. Since neither No. 54 nor No. 53 have any time available to depart Bridges under their schedules, the timetable has made a positive meet at Bridges. However, under the Standard Code rules, both trains would have to take the same siding at Bridges. It is obvious that the Nevada Central amended their rule (Perhaps even verbally, one never knows) to have the first train or motor
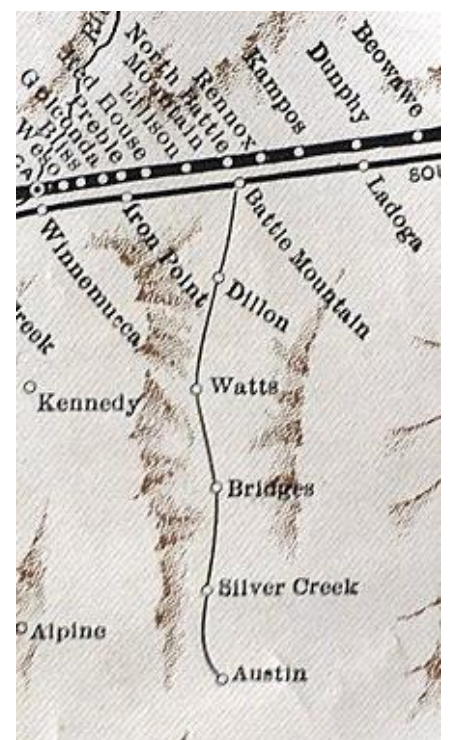
car arriving Bridges take the siding. The second train to arrive would head down the main and keep on moving.

As far as these stations, in 2020 none of these even appear to have any buildings standing except for Battle Mountain and Austin when one examines Google or Bing maps.

Now, for another major rules exception is the next paragraph. "Time Card rights and rules will prevail, whether service performed by steam train, or motor, EXCEPT: Steam trains will not exceed 16 miles per hour, and steam trains will disregard time shown at intermediate stations." I have never seen that rules deviation before and certainly would like to know the logic for it. I wonder if on some of the grades the steam trains made better time than the small rail motor cars they were using? Overall, at 16 MPH, the steam train would have taken more than 5 hours to reach Austin or Battle Mountain.

Now for those in Australia reading this, almost all of you will comment that this may be interesting but you never will see it. Well, if you do travel to the US and decide to take an auto trip, you very well may opt to travel U.S. 50 which is advertised as the "Loneliest Road in America". For a rail fan, US 50 passes near a number of attractions. It starts in California at Sacramento, near the California State Railroad Museum and a city with a light rail system. It passes over the

Sierra Mountain range through some of the California Gold Rush towns to Lake Tahoe on the California-Nevada border and passes in front of the Nevada State Railroad Museum south of Carson City and then heads east and passes 6 miles south of Virginia City which has a restored Virginia and Truckee Railroad excursion. It continues through the desert passing through Austin, the southern terminus of the Nevada Central and which still has the Stokes Castle, standing as a tourist site. From the Castle Stokes could look down upon the engine house and turntable of the NC. The last time I was in Austin, the NC turntable pit still existed, but it looks like a motel may now be on the site. You pass through Eureka, another mining camp and the terminus of the narrow gauge Eureka and Palisades

(no trace remaining) and end up in Ely at the Nevada Northern museum and tourist operation. I might also add that "The Loneliest Road in America" was quite successful and in the summer there is a lot of tourist traffic on it. In the winter it would not be a road you would want to be on stuck in a snow drift or skidded off into the ditch as it goes over numerous mini-mountain ranges in the Great Basin.

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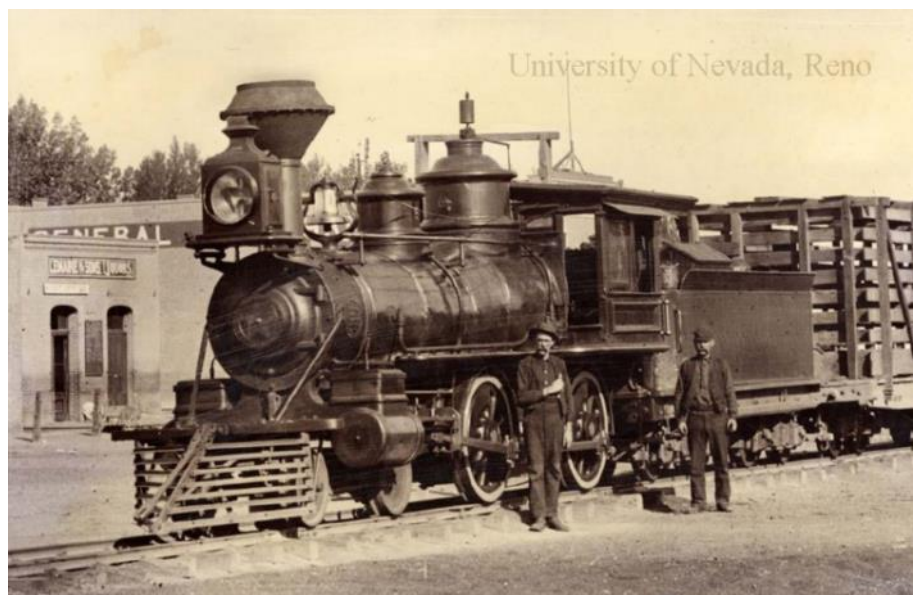
The Sydney's "government" bus public timetables 1932-2020

RICHARD C PECK, BA (HONS), DIP ED, MAP.

WHAT IS THE OLDEST Sydney government bus timetable? Perhaps the question should be what is the oldest public timetable known to have survived?

Government buses commenced in Sydney on Christmas Day 1932 with route 144 (see rear cover). During 1933, many routes started mainly as take-overs from private operators. Some were short-lived as the Omnibus Services officers in the Department of Road Transport struggled to fit services to road conditions. While a public timetable would be necessary from day 1, it may not always have been published. Prior to 1932 timetable compendiums were published by commercial firms and some also appeared in newspapers.

The oldest printed public timetable known to me is for route 67. This is a one quarto page printed by James & James of Ashfield (who also printed route 4 15/12/35 and route 2 4/4/37). However the main printer was the NSW Government Printer (route 59 8/12/35) until 1941. One late exception was "Railway Print" for route 235 and 236 28/11/38. These were all in the same format and issued as handbills or loose pages. We have dedicated employee enthusiasts to thank for this group of survivors. 26 different dates of timetables for 23 routes are

1

Department of Road Transport—Omnibus Services

ROUTE No. 159

ROSE BAY-EASTERN SUBURBS HOSPITAL and EARL STREET

via EAST BELLEVUE HILL AND BONDI JUNCTION

Commencing on MONDAY, 26th NOVEMBER, 1934 a Service will operate from Rose Bay to Eastern Suburbs Hospital & Earl Street Randwick via East Bellevue Hill and Bondi Junction

ROUTE—Balfour, Bunyula, Blaxland, Bundarra, Birriga, Victoria and Old South Head Roads, Oxford, Cowper, Ebley, Newland Cuthbert, Denison and Victoria Streets, York Road, Avoca Street, Earl Street.

For Further Particulars Ring W'loo Depot F2806, Continuous Service

MONDAYS TO SATURDAYS

Rose Bay Dept. a.m.	Birriga Road Dept. a.m.	Bondi Junction Dept. a.m.	Eastern Suburbs Hospital Dept. a.m.	Earl Street Randwick Arr. a.m.	Earl Street Randwick Dept. p.m.	Eastern Suburbs Hospital Dept. a.m.	Bondi Junction Dept. a.m.	Birriga Road Dept. a.m.	Rose Bay Arr. a.m.
7.45	7.52	7.58	8.3	8.6	8.10	8.13	8.18	8.25	8.31
8.15	8.22	8.28	8.33	8.36	8.40	8.43	8.48	8.55	9.1
8.45	8.52	8.58	9.3	9.6	9.10	9.13	9.18	9.25	9.31
9.15	9.22	9.28	9.33	9.36	9.40	9.43	9.48	9.55	10.1
9.45	9.52	9.58	10.3	10.6	10.10	10.13	10.18	10.25	10.31
thence hourly to						thence hourly to			
p.m. 4.45	p.m. 4.52	p.m. 4.58	p.m. 5.3	p.m. 5.6	p.m. 4.10	p.m. 4.13	p.m. 4.18	p.m. 4.25	p.m. 4.31
5.15	5.22	5.28	5.33	5.36	...	—	4.48	4.55	5.1
5.45	5.52	5.58	6.3	6.6	5.10	5.13	5.18	5.25	5.31
6.15	6.22	6.28	6.33	6.36	5.40	5.43	5.48	5.55	6.1
6.45	6.52	6.58	7.3	7.6	6.10	6.13	6.18	6.25	6.31
7.15	7.22	7.28	7.33	7.36	6.40	6.43	6.48	6.55	7.1
7.45	7.52	7.58	8.3	8.6	7.10	7.13	7.18	7.25	7.31
thence hourly to					7.40	7.43	7.48	7.55	8.1
10.45	10.52	10.58	11.3	11.6	8.10	8.13	8.18	8.25	8.31
					thence hourly to				
					10.10	10.13	10.18	10.25	10.31
					11.7	11.10	11.15	11.22	11.28

FRIDAYS ADDITIONAL.

p.m. 8.15	p.m. 8.22	p.m. 8.28	p.m. 8.33	p.m. 8.36	p.m. 8.40	p.m. 8.43	p.m. 8.48	p.m. 8.55	p.m. 9.1
9.15	9.22	9.28	9.33	9.36	9.40	9.43	9.48	9.55	10.1

SUNDAY SERVICE to come into operation on the First Sunday after the Opening of the Eastern Suburb's Hospital

Bondi Junction Dept. p.m.	Eastern Suburbs Hospital Dept. p.m.	Earl Street Randwick Arr. p.m.	Earl Street Randwick Dept. p.m.	Eastern Suburbs Hospital Dept. p.m.	Bondi Junction Arr. p.m.
1.28	1.34	1.37	1.45	1.48	1.53
1.58	2.4	2.7	2.15	2.18	2.53
2.28	2.34	2.37	2.45	2.48	2.53
Every 30 minutes to			Every 30 minutes to		
6.28	6.34	6.37	6.45	6.48	6.53

DEPARTMENT OF ROAD TRANSPORT AND TRAMWAYS, NEW SOUTH WALES.

OMNIBUS TIME-TABLES.

ROUTE 329.
CLOVELLY—BONDI JUNCTION.

ROUTE 330.
BONDI JUNCTION—CENTRAL RAILWAY.

ROUTE 331.
MARTIN PLACE—SOUTH HEAD CEMETERY.

ROUTE 333.
SOUTH HEAD CEMETERY—
CENTRAL RAILWAY.

ROUTES 358–359.
DOUBLE BAY—ROSE BAY—MAROUBRA
JUNCTION—PAGEWOOD.

ROUTES 360–363.
DOVER HEIGHTS—CENTRAL RAILWAY.

ROUTES 361–362.
MARTIN PLACE—NORTH BONDI—
DOVER HEIGHTS.

Commencing Sunday, 31st October, 1948.

‡ 99458 A

3

TROLLEY BUS TIME-TABLE

Rockdale - Kogarah

Sans Souci

Doll's Point Lines

•

Commencing:
SUNDAY, 26th NOV., 1950

Issued Gratis

(All previous Time-tables Cancelled)
Published by Authority of Commissioner for
Road Transport and Tramways, N.S.W.
(Crown Copyright Reserved)

4
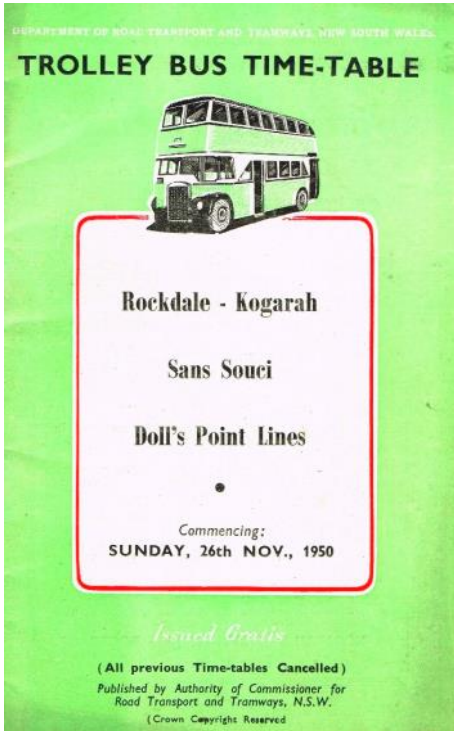
known until 1941 and copies have been placed in the Sydney Bus Museum timetable archive.

The Omnibus Division was created in 1938 and Head Office, 99 Macquarie St, Sydney occupied that year. A printing department began to print handbills and timetables in the basement soon after. State Archives at Kingswood contains two large albums in which were pasted every example of a tram and government bus handbill or timetable issued until it closed in the 1970s.The format was single page handbills used for pasting on tram or bus windows and stapled booklets. As the 1940s wore on, area timetables began to appear listing groups of routes.

An experiment was tried in 1950 whereby Terence B Gibbes of Bligh St, Sydney solicited advertising to pay for free timetable booklets. These were issued for routes 302-303, 318 and the trolleybus. However as the next trolleybus
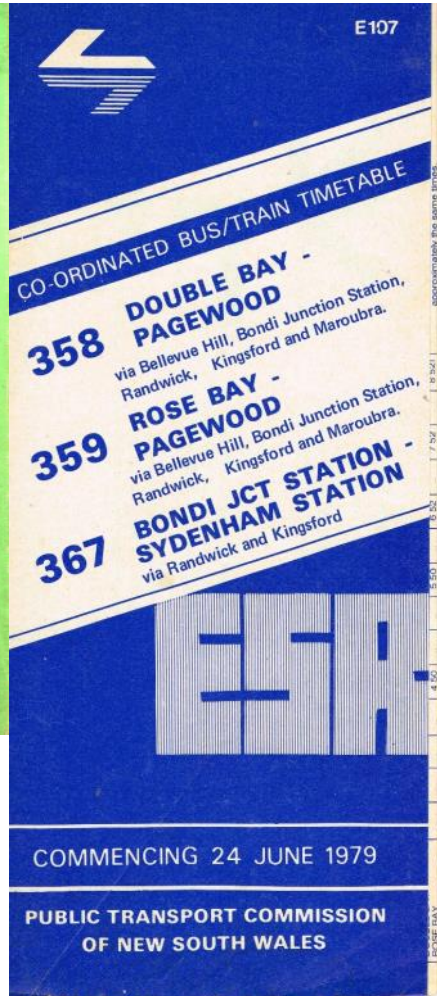
timetable reverted to the previous format in 1952 the experiment was not a success.

The booklet format continued through the Dept. of Government Tram & Omnibus Services era (1952), Dept. of Government Transport (1970) to Public Transport Commission (1973).

I am going to choose a group of routes for illustrating this article that is one of the longest surviving. Route 159 (Rose Bay-Eastern Suburbs Hospital-Earl St Randwick) commenced on 26/11/34 [see 1]. In the summer of 1937 it was extended to Clovelly Beach but from 4/1/38 also included a private route to Pagewood with a companion 158 to Double Bay. They were renumbered 358/359 on 12/5/40. [see 2 on page 10].

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A 358 Industrial (Bondi Junction-Sydenham Station) started on 7/9/42 (as 345, being renumbered 358 soon after). This ceased on 21/5/52 when it was effectively renumbered 367 (Sydenham-Bondi Junction with a short lived extension to Bellevue Hill School). Although it served the industrial area, this was always a public route.

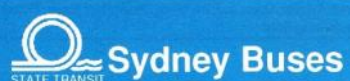The next major change was the opening of the Eastern Suburbs

8

Railway in 1979 when a coordinated public bus/train timetable was issued under the PTC banner on 24/6/79 (a 6 section fold out) [see 4] and the UTA 6/83 (12 page booklet) [see 5]. 367 was renumbered 357 from 31/1/86. A different

format was used from 2/11/89 (including a separate timetable with 313-316 Coogee services and a 356 limited stops Bondi Junction-Pagewood and 658 Bondi Junction-Uni of NSW).

The same format was used for the STA timetable of 5/8/90 [see 6]. By this time the 358 had ceased and the 359 altered to stop at Bondi Junction Interchange (the section to Rose Bay being numbered 321). This also included 400 and 043.

A "Sydney Buses" format appeared on 22/11/92-1999 [see 7].

A pocket version was issued in 11/02 [see 8] and a format incorporating pictures of bus operators at the same date [see 9]. 357 was also upgraded to a

10

11

daily route. Route 359 ceased from 26/4/09 so the 26/4/09 timetable was only for 357 [see 10]. From 18/3/12 this included the waratah logo for "Transport/ Sydney Buses".

From 20/10/13, the 357 was renumbered 418 (Burwood-Bondi Junction) and the "Transport" format adopted [see 11].

From 30/10/18 the 418 was split into 418 (Kingsford-Burwood via Sydenham) and 357 again (Mascot-Kingsford-Bondi Junction). From 2015, Transport ceased to offer free printed timetables, opting for you to print your own from their website.

This article has only scratched

the surface. You could examine the internal formats, style of maps and history of the routes if you wish.

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How Boston Saved $5Million by Routing School Buses with an Algorithm.

With 25,000 students and the nation's highest transportation costs, the Boston Public School District needed a better way to get kids to class.

EMMA COLEMAN

THE YELLOW SCHOOL BUS has remained largely unchanged since it first debuted in 1939. But while the buses look the same, their routes have grown infinitely more complex in the past 80 years, as the number of students, schools, and road systems grow and change.

Drawing bus routes for Boston Public Schools involves challenges unique to the city. BPS allows parents to select their child's school from a list of about ten options, in an effort to reduce inequalities that might result from isolating students to their neighborhoods. While this represents a greater level of choice than most cities, the resulting bus routes can be meandering and complicated.

Compounding that challenge is the fact that BPS provides more bus services than most other districts. All elementary school students who attend schools more than a mile from their home are offered yellow bus service to one of over 220 schools, and many live much farther than that. Some schools draw students from more than 20 different zip codes. Each of those schools also had different start times, between 7:15 and 9:30 a.m., so buses might have to visit multiple schools for pick up and drop off.

In 2017, the district was facing serious challenges. On a per-pupil basis, BPS had the highest transportation costs in the country, around $2,000 per student per year, representing 10 percent of the district's budget. The schools dealt with rising costs each year, despite declining ridership. The on-time performance rate of their buses was also well below that of other large districts.

With no clear vendor to turn to with this problem, BPS instead sought out experts, hosting a competition where researchers could experiment with anonymized BPS data sets to create efficient routes and optimal start times for each school.

"To put it simply, we wanted a solution that worked," said Will Eger, the BPS senior strategic projects manager. "There are lots of quirks in this transportation situation, and we wanted something that could address the vast majority of those issues while also being highly efficient, something that could run overnight at least."

Those quirks represent millions of decision variables that affect any solution, including varying road widths, differing bus infrastructures (for example, the presence of wheelchair lifts or child safety restraint seats), students who require the same bus driver every year, students who have monitors, and students who have been in fights and, therefore, need to be on different buses. It also includes the roughly 5,000 students who have a special need that requires door-to-door pick up and drop off (sometimes to non-BPS schools, as the city provides yellow bus service to students who attend charter and private schools within Boston, and to special education facilities outside the city).

Considering all those possibilities creates a "number of solutions so large that you can't even enumerate it," said Arthur Delarue, a Ph.D. candidate who worked with the team from the MIT Operations Research Center whose algorithm won the competition. The team spent hundreds of hours devising a solution to what Delarue called a "bold and unusual" challenge.

Their solution replaced what had before been an incredibly laborious process, one that took ten school-system routers thousands of hours to create custom routes for each child and school. Those employees still work with BPS, tracking routes that struggle with on-time performance, and managing route guidance for drivers (Google Maps isn't sufficient since it's built for cars, and 70-passenger buses can't, for example, easily make U-turns). But now, the MIT algorithm routes the entire system at once, providing a base for the human routers to tweak.

"The work of route managers in communicating with stakeholders such as drivers, principals, parents, and students is invaluable and cannot be replaced," Delarue said. "But in what order stops should be visited, and how that route gets designed can't be solved efficiently by humans. That's where we add value."

Sebastien Martin, another Ph.D. candidate at MIT who worked on the solution, said the dilemmas with drawing school bus routes have been studied since the 1960s, and many solutions have been proposed. "Each school district has such different needs, though, so it's hard to find a solution that works perfectly everywhere," he said. "The problem is so hard to solve that even the most powerful computers can't find a perfect solution for a district the size of Boston. There will always be trade-offs."

But even with trade-offs, using an algorithm, which the city tested for the first time in the 2017-2018 school year, has created dramatic results. In 30 minutes, the algorithm created a system-level route map that was 20 percent more efficient than the ones done by hand. The longer the algorithm runs, the better solution it produces, until it cannot be improved. Running the algorithm in the summer

of 2017 allowed for the system to eliminate 50 buses, an 8 percent drop in the fleet that was the largest Boston had seen in a single year. Buses drove 1 million fewer miles that year and cut 20,000 pounds of carbon dioxide emissions per day. The district reinvested the $5 million saved back into classroom initiatives.

"Incredibly, this was done without making bus rides or walk time to stops longer," said Eger. "We now have shorter walk times for younger students and those in dangerous neighborhoods, and we still minimized the total number of stops."

Much of the algorithm's success is derived from the fact that it takes a system-level approach, instead of independently routing individual schools and then connecting those routes together. Instead, the algorithm assigns students to stops, puts the stops in order to make no student's ride longer than an hour, and then takes a multi-school routing approach. The best solution, then, is not the one that uses the fewest number of buses for each school, but the one that most effectively recycles buses on paths to multiple schools—and the solution uses flexible integer programming that allows the district to adapt to changing policies.

Now in its third year of operation, Eger said that BPS runs the algorithm in the summer to create a master schedule, and then makes

modifications by hand throughout the year, though they're trying to integrate the two systems so that changes can be done by the algorithm throughout the year. But the more powerful potential to come out of the challenge, in his opinion, was another algorithm, one that allows for "unprecedented insight" into the implications of policy changes, such as school start times.

"This was really eye opening for us," said Eger. "We can understand now the cost and equity effects, and number of students who might be impacted by any given policy changes."

But just because the district has been able to clearly enumerate the effects of policy changes doesn't mean they've been popular. In December 2017, based on the recommendations of the algorithm, the Boston School Committee approved changes in school start times for the first time in 30 years. Those changes would have involved 85 percent of schools.

The move was based on several considerations, including research that showed starting high school before 8 a.m. has detrimental effects on the learning ability of teenagers. MIT research also showed that Boston was inequitable—while most parents prefer start times between 8:00 and 8:30 a.m., only 10 percent of white students in Boston start before 8:00 a.m., compared to 30 percent of black students. Higher-income students

generally start later, at the more desirable times.

So the team worked to swap the start times of high schools with elementary schools in the district, and optimize the start times based on route feasibility, teen health, parent preferences, and equity. Their school start time algorithm explored the trade-offs to different start times, and found a balance point between all considerations. If it had been deployed, it would have changed the number of teenagers with early high school start times from 74 percent to just 6 percent.

But it wasn't deployed. After it was unveiled, parents loudly objected to the proposal. Less than a month later, the district repealed the proposed new school start times. As Dimitris Bertsimas, a professor who led the MIT team, pointed out in a presentation about the solution, those who favored the status quo had the most to lose. "When your kids are affected negatively, it is hard to see the big picture," he said.

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NEVADA CENTRAL

Sagebrush

NARROW GAUGE