

Timetable Oddity #1

By **GEOFF LAMBERT**. *In this irregular column, we will look at some of the esoterica, trivia and curiosa of the timetable world. Readers are invited to submit their favourite oddity for presentation.*

Our oddity this month comes from the Western Australian Government Railways and Tramways Institute *Safe Working Catechism* for 1942 (price 2/-).

If you are a devout Christian, you will associate catechisms with religion, but this method of *Instruction by question and answer* (as the Oxford Dictionary puts it) was occasionally used in other fields. For some reason, Australian railways took a real shine to them. The NSW Railways or the NSW Railways Institute published many editions of many volumes of catechisms in the twentieth century— they were still being produced in the late 1980s. Most were devoted to signalling and safeworking, but there were also volumes on station management, shunters' duties, the Westinghouse brake and other topics. Usually, as so often was the case in the church, catechisms were rote-learning methods used before a candidate sat an examination. The style varied from the severely didactic which were scarcely different from the rule-book itself, to a more easy-going vernacular style, which probably had a greater impact in conveying the meaning of the rules and preparing the candidate for the exam.

The timetable reproduced below is from one of the latter, the 1942 WARTI catechism, which wades right in to Staff and Ticket Working with this timetable on page 1. The first Q&A is: 1. 'Describe the Staff & Ticket system: A safeworking system to prevent trains meeting head-on in the section'. Plain talking, I think they call it. Questions 8 to 43 in this section used the timetable as their focus.

Obviously, with station names like those given, students were expected to take a phlegmatic view of safeworking. The running times of the trains somewhat belie this though— they seem to be only 1 or 2 minutes per section, the whole timetable of 14 trains covers just 2½ hours. It would have kept a safeworking officer busy—and the crews too—some trains have turn-around times of only 2 minutes. Readers might like to work out which trains travelled on Staff and which on Ticket. And also find at least one error in the timetable—I wonder if it were deliberate?

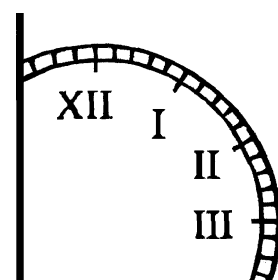
TIME-TABLE STAFF AND TICKET SYSTEM

"DOWN" JOURNEY

Stations		1 Goods	3 Mixed	5 Passgr.	7 Mixed	9 Express	11 Mixed	13 Goods
Calm	dep.	p.m. 7.0	p.m. 7.8	p.m. 7.25	p.m. 7.50	p.m. 8.0	p.m. 8.30	p.m. 9.0
Cool	arr.			7.24	7.52		8.32	9.2
"	dep.	7.2	7.10	—4			—10	
Collected	arr.	7.4	7.12	7.35	7.56		8.33	9.7
"	dep.	7.5	7.22	7.38		8.2	8.45	9.14
Eureka	arr.	7.6	7.23	7.39		8.3	8.46	9.15
Returning as		2	4	6	8	10	12	14

"UP" JOURNEY

Stations		2 Passgr.	4 Express	6 Goods	8 Mixed	10 Goods	12 Mixed	14 Pickup
Eureka	dep.	p.m. 7.13	p.m. 7.29	p.m. 7.41		p.m. 8.20	p.m. 8.48	p.m. 9.20
Collected	arr.	7.14				8.21	8.49	9.21
"	dep.	—3	7.16	7.30	7.42	8.8	8.25	8.54
Cool	arr.		7.18	7.31	8.10	8.27	8.54	9.26
"	dep.		—5	7.32	8.13	—11	8.56	9.29
Calm	arr.	7.20	7.34	7.46	8.15	8.39	8.58	9.31



The Times

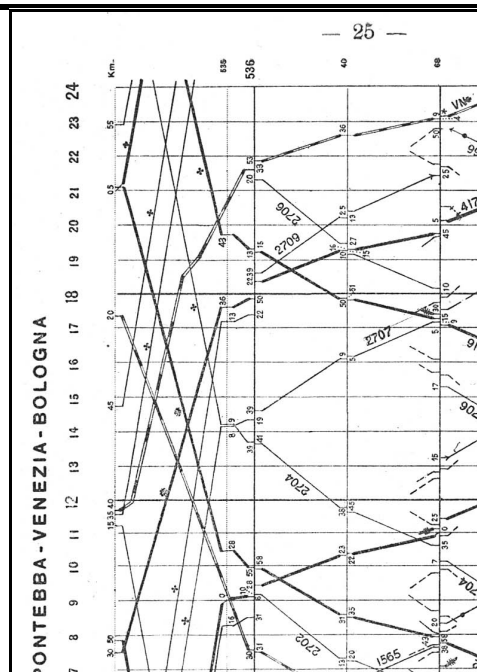
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An Italian lesson in
timetable reading

The Times

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Editor	Geoff Lambert
Editorial Team	Victor Isaacs, Duncan MacAuslan.
Contacting the Editor	The Times welcomes articles and mail and will be pleased to receive yours. Please send articles and letters to Geoff Lambert, 179 Sydney Rd FAIRLIGHT NSW 2094 Email: G.Lambert@unsw.edu.au Phone 61 2 9949 3521; Fax 61 2 9948 7862
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AATTC Who's who

President	Chris Brownbill	37 Grange Rd BLACKBURN SOUTH Vic 3130	(03)9803-2880
Vice-President	Graham Duffin	P.O. Box 13074 Brisbane George St. Qld 4003	(07) 3275-1833
Secretary	Stephen Ward	12/1219 Centre Rd SOUTH OAKLEIGH Vic 3167	(03) 9789-2263
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Distribution Officer	Steven Haby	24/53 Bishop St BOX HILL VIC 3128	(03) 9898-9724
Editor, The Times	Geoff Lambert	179 Sydney Rd FAIRLIGHT 2094	(02) 9949-3521
Editor, Table Talk	Albert Isaacs	Unit 5, Whitehall, 22 Burwood Rd HAWTHORN Vic 3122	(03) 9819-5080
Membership Officer	Victor Isaacs	43 Lowanna St BRADDON ACT 2612	(02) 6257-1742
Production Manager	Graeme Cleak	PO Box 315 NUNAWADING Vic 3131	(03) 9877-4130
Promotions Officer	Bruce Cook	PO Box 563 SUTHERLAND NSW 1499	0412 845 123
Committee member	Duncan MacAuslan	19 Ellen St ROZELLE NSW 2039	(02) 9555 2667
	Michael Smith	9/26-30 Linda St HORNSBY NSW 2077	0407 218 962
Adelaide Convenor	Robert Field	136 Old Mt Barker Rd STIRLING SA 5152	(08) 8339-2065
Brisbane Convenor	Brian Webber	8 Coachwood St KEPERA Qld 4054	(07) 3354-2140
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Sydney Convenor	Bruce Cook	PO Box 563 SUTHERLAND NSW 1499	0412 845 123

Saxon world, train graphs were not deemed to be of sufficient interest to warrant inclusion in textbooks, not even as a casual illustration^{xii}. One would be inclined to conclude from this that in the Anglo-Saxon world there was also very little awareness among the general public of the use of train graphs. From the latter it is only a small step to assume that in the Anglo-Saxon world, in contrast to continental Europe, train graphs were never used as public time tables. Indeed, no evidence to the contrary has been found so far.

In conclusion, it seems safe to say that the publication of the Italian train graph of 1906 was not an isolated event. Even though it is not clear how often such public train graphs were published, their very appearance throughout most of continental Europe is an indication that there was an awareness of the concept of train graphs. This awareness is also reflected in the inclusion of the use of actual train graphs in mathematics teaching. In its turn, the latter must have contributed to the appreciation of train graphs as such and an acceptance of train graphs for public use.

At least in the German-speaking countries, this symbiosis still exists. In many a German or Swiss school, train graphs ("Bildfahrpläne") are still taught as part of the middle school curriculum. At the same time, it is not uncommon in either country to be presented with a graphical train schedule – particularly when it comes to small private tracks^{xiii}. In contrast, in the Anglo-Saxon world the concept of a train graph never seems to have caught the general public's attention. Although train graphs were adopted at an early stage for the purposes of planning and still are being used as such, no *public* train graphs were ever published. At the same time, the idea to include train graphs in mathematics teaching never caught on. One can only speculate about what

was behind this very different public reception of the concept of the graphical time table.

(0). The Times (1996) vol 13 #1, p7-11 .

(i) The web pages on this booklet are part of a website devoted to anything train-related in the area around Asti in the Piemonte. To get directly to the booklet, type http://provincia.asti.it/treniasti/archivio/testi/orario_1906/index.html.

(ii) The FS was created in 1905 from, the Società per le Strade Ferrate del Mediterraneo, or Mediterranean system, or RM, which followed the Mediterranean coast and the Società per le Strade Meridionali (Esercizio della Rete Adriatica), or Adriatic system, or RA, which followed the Adriatic coast. A third, less important constituent of the FS was the Società per le Strade Ferrate della Sicilia, or Sicilian system, or RS.

(iii) See <http://www.dbb.ch/boutique/boutique.html>. The nice presentation of this poster seems to suggest it was intended for public use. There is far more detail, however, than the public would ever need. Not only does this poster contain the train graphs themselves (even those pertaining to freight services), but it also graphically displays the elevation along the tracks as well as various rail related objects (with symbols for, among others, water stations, electrical signals and mechanical signals).

(iv) This train graph is figure 45 in H. G. Funkhouser, "Historical development of the graphical representation of statistical data," *Osiris* 3 (1937), pp.269-404.

(v) This movement has mostly been studied for individual nations and even so, research is rather scattered. One of the better overviews for the sciences and mathematics is: Bruno Belhoste, Hélène Gispert, and Nicole Hulin (eds) *Les sciences au Lycée. Un siècle de réformes des mathématiques et de la physique en France et à l'étranger* (Paris: Vuibert, 1996) (in French)

(vi) On the introduction of graphs in the sciences, see Thomas Hankins, "Blood, Dirt, and Nomograms," *Isis* 50(1999), pp.50-90. Although Hankins does not mention train graphs, their invention does provide a neat illustration of the developments he sketches.

(vii) See *Programmes d'enseignement dans les lycées et collèges de garçons* (Paris: Delalain Frères, 1903)

(viii) Laisant's treatment of train graphs constitutes section 48 (pp. 121-123) of his book.

(ix) J. Droste & W. F. de Groot, *Funcities. Eerste Deel: Grafische Voorstellingen* (Groningen: Wolters, 1923), pp. 130-134. The first author of this note (EA) is currently pursuing research into

the use of train graphs in the various European mathematics curricula and he would appreciate any comments or pointers.

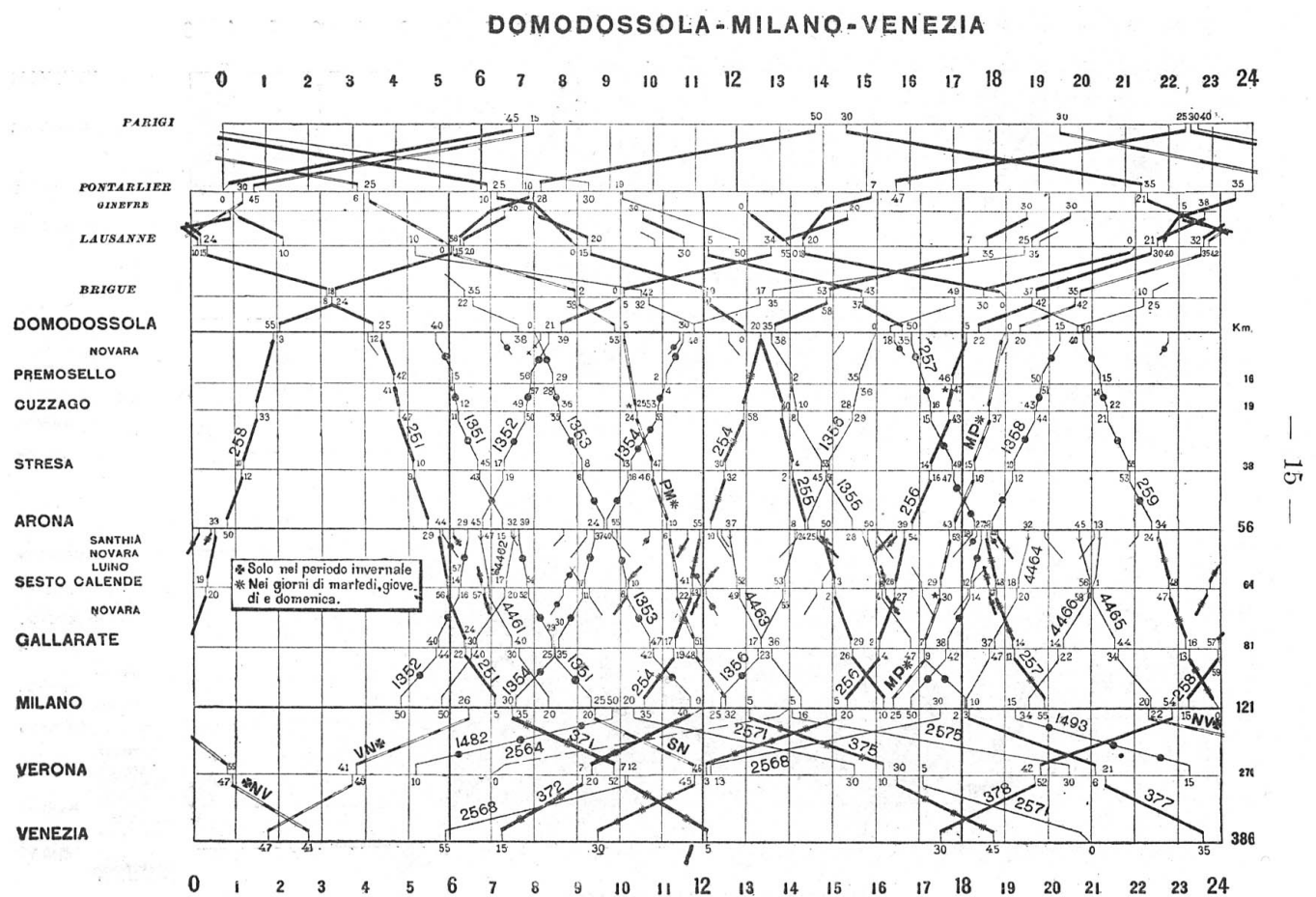
(x) Florian Cajori, "Graphic Railroad Time-Tables," *School Science and Mathematics* 9 (1910), pp.204-205. In an addendum to Cajori's note, Wooster Woodruff Beman does list a few more (French) books that include graphic railroad tables (*School Science and Mathematics* 9 (1910), p. 567.

(xi) Hawkes also wrote a more traditional (and commercially more successful) *Advanced Algebra* (1905) for about the same audience (first year of High School). His bicycle problem is on p. 26: "A man starts out to ride on a bicycle at the rate of 8 miles an hour. After riding 2 1/2 hours he stops for 1 1/2 hours, then continues at his former rate. Four hours after the first man starts, a second man leaves the same place on a motor cycle at the rate of 16 miles an hour. How far must the second man ride to overtake the first?"

(xii) Interestingly, a link between train graphs and mathematics teaching was made almost three decades before the French curriculum reform by George Vose (1831-1910), professor of civil engineering at Bowdoin College, in his *Graphic Method for Solving Certain Algebraic Problems* of 1875. In this book, Vose provides graphical solutions to basically the same category of problems that Laisant was to discuss. His book, however, seems to have gone completely unnoticed. An interesting tidbit is that in his preface Vose claims that "his method was suggested by the common mode of representing the movement of railway trains, which was employed as long ago as 1850, and was first brought to the writer's knowledge by S.S. Post, the well-known civil engineer." The final paragraphs of his book make it very clear that he is referring to the method of train graphs indeed. Clearly train graphs were in use not even a decade after their invention in France. Incidentally, S.S. Post would be Simeon S. Post (1805-1872) of Patent Truss Bridges fame and in the 1850s Chief Engineer of both the New York and Erie Railroad and the Ohio and Mississippi Railroad. In Post's obituary (*Transactions of the American Society of Civil Engineers* 28 (1893), p. 49-50), he is actually credited with the invention of the "diagram for making rail-road time-tables." Of course, we now know that this would be a bit too much credit.

(xiii) See for instance http://www.blonaychamby.ch/graphique_2001.html. The Verein Dampfbahn Bern also provides a schedule for its lines in the form of a set of train graphs.

Another reference for the use of timetables as a mathematical teaching aid, is S. McLean, "Mathematics Today— Year 7", *The Times* No. 69, p5-6.



The Simplon tunnel, just northwest of Domodossola was opened on 1st June 1906, just 3 months before the publishing date of this timetable—perhaps it was the trigger for this unusual timetable. Fifteen passenger trains thread the tunnel in this graph; there seem to be about 3 “meets” inside the tunnel, between Domodossola and Briga (Brig).

course of the trains^{ix}. A notable exception to the use of train graphs in mathematics teaching are the British textbooks and, more generally, those in use throughout the whole of the Anglo-Saxon world (including the United States). Certainly, spatio-temporal diagrams involving trains do show up (albeit not too frequently), but the connection with real-world train graphs is seldom made. The graphing problems discussed in the various algebra textbooks by Henry Sinclair Hall (1848-1934) and his faithful collaborator Samuel Knight, for instance, sometimes involve trains, but mostly they are about bicycles and cars. Also, instead of having their trains, bicycles and cars in their problems leave from real towns, Hall & Knight usual have them depart

from town A or B. Whereas Laisant, Tannery and their French colleagues used real train graphs as an introduction or illustration to the mathematics of graphing functions, Hall & Knight do not avail themselves of this reference frame. In the United States, still struggling to establish a textbook tradition independent of those within the Commonwealth, train graphs would actually be brought up in 1910 by Florian Cajori (1859-1930), then at Colorado College, as a contribution to an ongoing discussion on including application of mathematics in textbooks. In his short note, Cajori pointed out that French and German mathematics textbooks often include train graphs. In his view such train graphs are an ex-

cellent application of mathematics to the real world and he calls for inclusion of such graphs in American textbooks as well. His call however went almost completely unheeded^x. Other to the train problems in the American editions of the books of the Hall & Knight, cooked-up spatio-temporal diagrams involving bicycles rather than trains only make a brief appearance in the rather ambitious *Higher Algebra* (1913) by the later dean of Columbia University Herbert E. Hawkes (1872-1943)^{xi}. In short, there was precious little interest in the concept of a train graph among textbook writers in the Anglo-Saxon world. For all the fascination that almost any other aspect of railroading held for the general public in the Anglo-

Early timetables of the Queensland Railways

Your public library is sure to contain copies of the *Government Gazettes* of most Australian states. In them, especially those of the last half of the nineteenth century, you will find many transport timetables. VICTOR ISAACS has been browsing in the Canberra libraries, and here presents the results of his searches for Queensland train timetables.

This article draws on early Queensland Railway timetables published in the Queensland Government Gazette.

The first illustration (right) shows the opening timetable of Queensland Railways from Ipswich (original station) to Bigge's Camp. Queensland opened its first line comparatively late - in 1865. Queensland was unique among the colonies for not starting its railway system from its capital. Queensland was so short of money when the first railway was suggested that it was decided not to build from Brisbane to Ipswich, as that could be covered by water transport along the Brisbane and Bremer Rivers. Bigge was the name of the contractor for the first section of railway. Because it was considered that Bigge's Camp was not an imposing name it was literally translated into Latin. Thus the present name: Grandchester.

The second illustration (page 4, top) is only a short time later in 1866. But it is interesting because it shows all types of trains - passenger, mixed and goods. It is strange that goods trains were shown in a public document. It is also interesting that this timetable indicates the crossing points for trains. This featured irregularly in timetables published in the Govern-

SOUTHERN AND WESTERN RAILWAY.
THE following Time Table will be observed on the Southern and Western Railway from and after MONDAY, the 14th. August, 1865, until further notice.

WEEK-DAYS.			
Miles.		Mail.	Mixed.
		1-2 a.m.	1-2 p.m.
7½	Ipswich, departure	7:00	2:15
	Walloon, arrival	7:30	2:15
	Walloon, departure	7:35	2:50
21½	Bigge's Camp	8:15	3:30

WEEK-DAYS.			
Miles.		Mixed.	Mail.
		1-2 a.m.	1-2 p.m.
13½	Bigge's Camp, departure	9:00	4:15
	Walloon, arrival	9:45	4:55
	Walloon, departure	9:50	5:00
21½	Ipswich	10:15	5:30

[L.S.] A. O. HERBERT,
 Commissioner for Railways.
 Railway Department.
 Brisbane, 9th August, 1865.

The first Queensland trains ran to this timetable. Bigge's Camp was soon to become Grandchester—the same, only different

ment Gazette. Illustrations three (page 4, bottom) and four (page 5, top) show the complete timetable of Queensland Railways in 1875. The “system” then consisted of two separate lines. The Southern and Western line now ran from Brisbane inland to Ipswich, across the fertile

hinterland to Helidon, ascended the steep escarpment to Toowoomba, then descended on the western side. At Gowrie Junction the line bifurcated. The original line went across the western plains to Dalby. The other line turned south across the Darling Downs to what was then called Warwick, but what

SOUTHERN AND WESTERN RAILWAY.
TIME TABLE.

NOTICE is hereby given, that on and after the 1st January next, the following Amended Time Table will come into operation on the Southern and Western Railway.

MILES.	UP. STATIONS.	WEEK DAYS.			MILES.	DOWN. STATIONS.	WEEK DAYS.		
		1.	2.	3.			1.	2.	3.
		Goods.	Pass.	Mixed Goods and Pass.			Mixed Goods and Pass.	Goods.	Pass.
		a.m.	a.m.	p.m.		a.m.	a.m.	p.m.	
8	Ipswich	6:10	10:0	4:0	12	Helidon	8:0	11:50	3:30
12	Walloon	6:40	*10:30	4:30	12	Gatton	*8:40	*12:30	4:5
18	Rosewood	(A.)	(A.)	(A.)	21	Laidley	9:10	1:5	4:35
21	Western Creek	(A.)	(A.)	(A.)	25	Victoria Tunnel	(A.)	(A.)	(A.)
25	Grandchester	7:25	11:5	*5:15	29	Grandchester	9:50	1:45	*5:15
29	Victoria Tunnel	(A.)	(A.)	(A.)	32	Western Creek	(A.)	(A.)	(A.)
32	Laidley	8:10	12:0	6:0	38	Rosewood	(A.)	(A.)	(A.)
38	Gatton	*8:40	*12:30	6:30	42	Walloon	*10:30	2:25	6:0
50	Helidon	9:20	1:10	7:10	50	Ipswich	11:0	2:55	6:30

* Trains meet here.

NOTE.—The Trains will stop only at those places at which they are timed to stop (except as mentioned below), unless expressly otherwise ordered by the Commissioner or Traffic Manager.

(A.)—The Trains marked thus, (A.), will stop by signal to take up passengers only, who will be charged at proportionate rates to the Station at which their journey terminates. Passengers requiring to alight at these places can only do so by giving notice at the preceding Station to the Guard of the Train, and paying the proportionate fare at the time of Booking from the place at which they join the Train to the place at which they propose to alight.

[L.S.] A. O. HERBERT,

Commissioner for Railways Office,
Brisbane, 24th December, 1866.

Commissioner for Railways.

Grandchester it now is. Train 1 meets train 1, train 2 meets train 2 and train 3 meets train 3!

is now the unimportant siding of Millhill. The date of 1875 was selected for illustration, as it was then that the railway finally reached Brisbane.

There were two trains to Toowoomba, one of which continues to Dalby. There were two daily to Warwick. There were also two trains only as far as Ipswich, giving a

total of four trains between Brisbane and Ipswich. Today there are 46 on weekdays, plus many short workings.

Separately the Northern Railway ran inland from Rockhampton, but only 44 miles to Rocky Creek (now near Herbert's Creek). This line had little traffic and had been built as a sop to northern interests to balance expenditure on the Southern and Western lines. By 1892 it extended all the way to Longreach and 1928 to Winton. In 1875 this section of line had one mixed train a day. Today it conveys immense tonnages of traffic, mainly coal for export.

These timetables are extracted from the Queensland Government Gazette, which published railways timetables from 1865 until 1889. Timetables were published when new sections of line opened and when services changed. As well, timetables were often reprinted for no apparent reason, probably to fill up

NORTHERN RAILWAY.—On and after 1st October, 1874, the following Time Table will come into operation until further notice.

A. O. HERBERT,
Commissioner for Railways.

Miles from Rockhampton.	Stations	Up Train, Mixed.	Miles from Rocky Creek.	Stations	Down Train Mixed.
...	Rockhampton	a.m.	...	Rocky Creek	p.m.
5	Gracemere	11:0	6	Goganjo	3:0
15	Stanwell	12:0	14	Westwood { arrive	3:55
24	Rosewood	A	20	Westwood { depart	4:0
30	Westwood { arrive	1:0	24	Rosewood	A
33	Goganjo { depart	1:15	29	Stanwell	5:0
38	Rosewood	1:47	38	Gracemere	6:36
44	Rocky Creek	2:10	44	Rockhampton	6:0

All Day Tickets issued on Saturdays available to return on the following Monday.
(A.) The Trains marked thus, A, will stop by signal to take up passengers only, who will be charged the fare to the Station at which their journey terminates. Passengers requiring to alight at those places can only do so by giving notice at the preceding Station to the Guard of the Train, and paying the fare at the time of booking, from the place at which they join the Train to the place at which they propose to alight.

SOUTHERN AND WESTERN RAILWAY.

TRAFFIC EARNINGS.

Week ending	Passenger Fares.		Goods and Live Stock.		Parcels and Miscellaneous.		Total.
	£	s. d.	£	s. d.	£	s. d.	
December 26th, 1874	1806	4 11	1,831	12 0	55	19 5	3,193 16 4
Corresponding week last year	622	8 0	1,312	7 1	68	13 3	2,043 9 4
Increase	643	16 11	519	4 11	...	...	1,150 8 0
Decrease ... ..	...	...	...	...	12	13 10	...

A. O. HERBERT,
Commissioner for Railways.

On the Northern Railway in 1874. It looks like the entire service needed only 1 locomotive

elaboration, train graphs are mentioned (“graphique de chemin de fer”). To introduce train graphs at this point in the curriculum makes eminent pedagogical sense. The fact that no further explanation about these graphs is given seems to indicate that the concept was well-known.

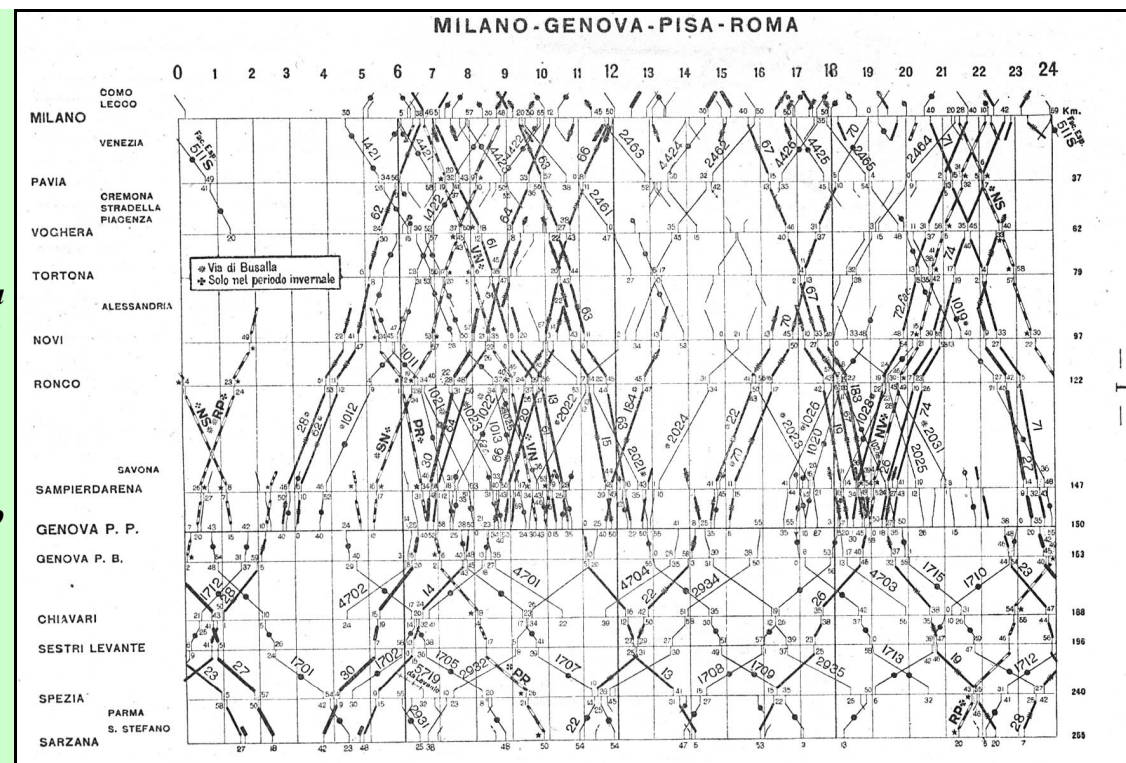
Not surprisingly given the centrality to the approved plan of study to French secondary-level teaching at the time, all of the French mathematics textbooks of the era that we have examined discuss train graphs. In his *Initiation Mathématique* of 1906, a self-study book for precocious middle school students, the political firebrand Charles-Ange Laisant (1841-1920) converts the tabular time table for the track Paris-Marseille to a train graph and explains how to read it. For him, writing for students somewhat younger than those following the regular program, the pedagogical value of the train graph seems to reside mainly in the fact that students can get to use graph paper and can construct train graphs of their own, using local tracks that they know or can identify with. Clearly, Laisant thinks of train

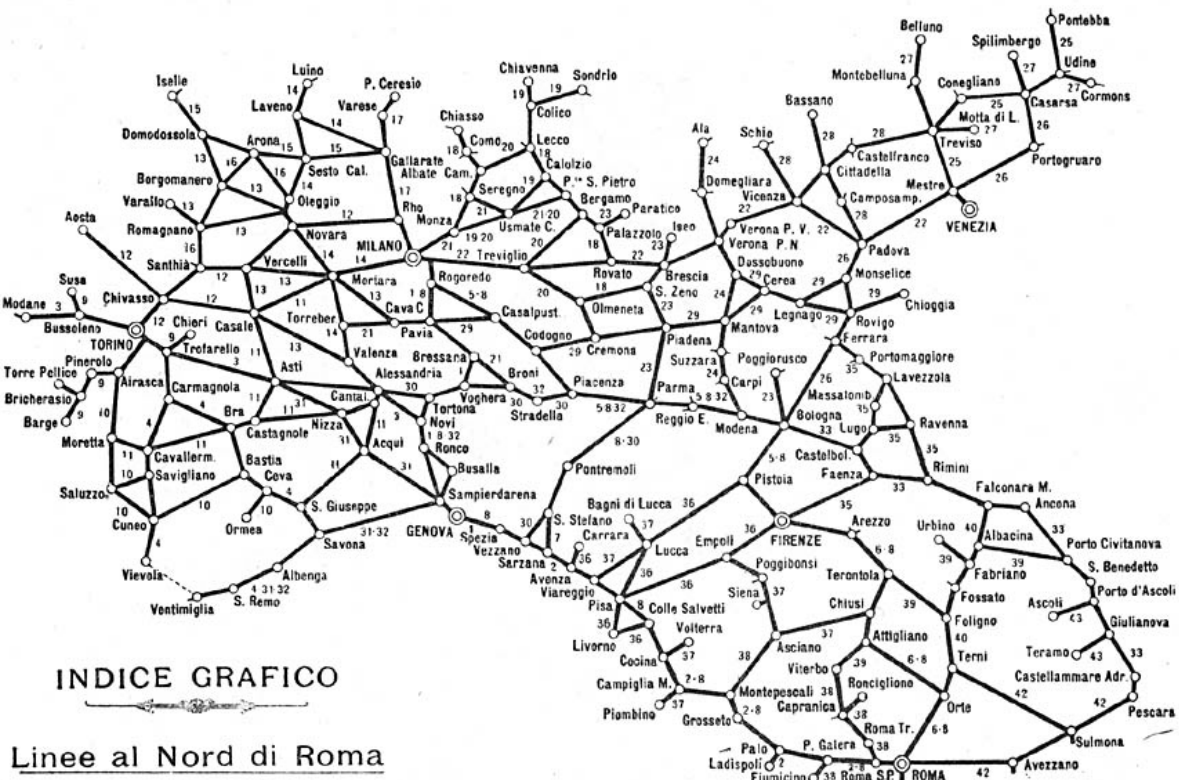
graphs as just a special case of what he calls “graphical computation.” Along with the train graph, he also discusses how to graphically solve a problem involving two bicyclists traveling together with only one bicycle at their disposal. Similar, even more involved problems are included as well. He does however present train graphs as a real-world application of mathematics. A somewhat more abstract approach is taken by Jules Tannery (1848-1910) in his *Notions de Mathématiques* of 1906 as well^{viii}. Tannery starts from the mathematics. He carefully explains how a graph can be used to represent the path of a train along several stations and how the slope of each of the line segments represents the velocity of the train. In doing so, he refers to his stations by using letters A, B, ..., E and he never uses a real time graph. Still, he does point out that the whole procedure is very useful in putting actual train schedules together.

It is not quite clear how widespread the use of train graphs in mathematics teaching in other

countries was. France was (and is) about the only nation in the world to have a national curriculum with its requirements spelled out in the minutest detail. The fact is that train graphs did begin to appear in mathematics textbooks in other countries as well, although initially most can be found in translations of French textbooks. The widely-used German *Elemente der Mathematik* of 1909, a compilation and translation by Paul Stäckel (1862-1919) of several of the textbooks penned by the famous mathematician Emile Borel (1871-1956), for instance, retained Borel's train graphs, only changing the towns the trains pass through to German ones. A much later application of train graphs shows up in a Dutch pre-calculus textbook of 1923, where they were used to introduce the relatively abstract concept of a piecewise-defined function. The tracks that the authors refer to are real tracks, but probably the schedules that they used were cooked-up. The authors do explain that actual train schedules are put together using graphical representations of the

One of the main lines—graph 1 in the booklet. This is the line running from Milan, through Genoa and Pisa to Rome. This is the northern half, the entire line service took 2 graphs. There appear to be about 70 trains per day in the busiest section, north of Genoa.





might have been an expectation that students might be exposed to it in their daily lives outside of school. The latter rationale for the inclusion of train graphs becomes all the more plausible given the nature of the then ongoing reforms in mathematics teaching.

The 1900s and 1910s were a time of far-reaching reforms in all of education, but particularly in science and mathematics teaching^v. In many ways, the rhetoric of the educational reform movement (if not the actual implementation of the reforms called for) was eerily similar to that of today's reform movements. Then as now, the best education was to be available to all children, regardless of their inclinations and abilities. In order to achieve this goal, a more student-oriented approach to teaching was called for. Likewise, to pique the interests of the students, real-life applications of the sciences and mathematics were touted as the most natural way to introduce new concepts, particularly when dealing with lesser-gifted students. On the level of content, much of the reform movement in science and

mathematics teaching was about the early introduction of the concept of a function and the use of more graphical methods as an alternative to purely algebraic methods to solve certain mathematical problems. Although in the course of the 19th century graphs had come to be in widespread use in the sciences and engineering and began to be used in non-specialist publications as well, education had largely ignored them. Science and engineering students were exposed to the use of graphs only in the final years of their education, while those in other fields might not see graphs as all^{vi}. Typically, 19th century secondary education in science and mathematics focused on manipulation (mathematics) and tabulation (sciences) and did not include any graphing at all. In the interest of scientific literacy this had to change, especially for the non-scientists who would never be exposed to graphs through study of the sciences, and the natural place to introduce early graphing was mathematics.

In France, the call for educational

reforms had led to the creation of a two-way specialization in high school, which took effect in 1903^{vii}. For the last three years of their secondary education (the so-called "Second Cycle"), students had the option to specialize in either the sciences ("Classe de Mathématiques") or the humanities ("Classe de Philosophie"). Students opting for the sciences would still be exposed to a mathematics curriculum not very different from that of 50 years earlier. The other students, however, followed a curriculum that was much more real-life oriented. It is in the government-published plan of study for this curriculum that we find reference to graphical time tables. In their first year, completely in line with the standard requests for educational reforms, humanities students were to be introduced to the concept of a function, the equation of a straight line, and the use of graph paper. Still in line with the standard requests for reform, the graph paper was then to be used to sketch certain graphs and to find their points of intersection. Right after this, without any further

TIME TABLE.
SOUTHERN AND WESTERN RAILWAY.—On and after 14th June, 1875, the following Time Table will come into operation until further notice.

Commissioner for Railways' Office,
Brisbane, 9th June, 1875.

A. O. HERBERT,
Commissioner for Railways.

BRISBANE, IPSWICH, TOOWOOMBA, DALBY, AND WARWICK.

FEET ABOVE WATER MARK.	MILES.		STATIONS.	UP TRAINS.						MILES.		STATIONS.	DOWN TRAINS.					
	From Brisbane.	From Toowoomba.		A.M.	A.M.	NOON.	P.M.	P.M.	P.M.	From Dalby.	From Warwick.		A.M.	A.M.	A.M.	A.M.	P.M.	P.M.
68	...	...	Brisbane	...	...	...	...	...	...	...	...	...	...	...	...	...	...
37	51	...	Milton	...	...	...	...	...	...	...	...	...	...	...	...	...	...
43	...	...	Toowoomba	...	...	...	...	...	...	...	...	...	...	...	...	...	...
44	41	...	Indooroopilly	...	...	...	...	...	...	...	...	...	...	...	...	...	...
77	6	...	Ozley Point	...	...	...	...	...	...	...	...	...	...	...	...	...	...
82	71	...	Ozley West	...	...	...	...	...	...	...	...	...	...	...	...	...	...
43	14	...	Goodna	...	...	...	...	...	...	...	...	...	...	...	...	...	...
86	16	...	Sedbank	...	...	...	...	...	...	...	...	...	...	...	...	...	...
91	17	...	Stoghill Ferry	...	...	...	...	...	...	...	...	...	...	...	...	...	...
74	204	...	Bindamba	...	...	...	...	...	...	...	...	...	...	...	...	...	...
66	251	...	Ipswich	...	...	...	...	...	...	...	...	...	...	...	...	...	...
111	30	...	Walloon	...	...	...	...	...	...	...	...	...	...	...	...	...	...
140	34	...	Rosewood	...	...	...	...	...	...	...	...	...	...	...	...	...	...
109	40	...	Western Creek	...	...	...	...	...	...	...	...	...	...	...	...	...	...
274	45	...	Grandchester	...	...	...	...	...	...	...	...	...	...	...	...	...	...
676	47	...	Victoria Tunnel	...	...	...	...	...	...	...	...	...	...	...	...	...	...
336	51	...	Laidley	...	...	...	...	...	...	...	...	...	...	...	...	...	...
340	60	...	Gatton	...	...	...	...	...	...	...	...	...	...	...	...	...	...
465	71	...	Hellidon	...	...	...	...	...	...	...	...	...	...	...	...	...	...
788	81	...	Murphy's Creek	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1630	91	...	Highfields	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1921	100	...	Toowoomba	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1677	104	...	Mahoney's Gate	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1677	107	...	Gowrie Junction	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1577	107	7	Gowrie Junction	depart	11:25	...	...	...	...	...	...	...	...	...	...	...	...
1112	112	121	For Williams' Camp	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1023	124	124	Westbrook Crossing	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1432	143	45	Emu Creek Siding	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1500	144	44	Emu Creek	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1498	163	63	Clifton	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1677	167	67	Milton	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1122	168	68	Warwick	...	...	...	...	...	...	...	...	...	...	...	...	...	...

In 1875 the southern part of the QR was much larger and busier than the northern part. Embryonic timetable collectors were pleased that this public timetable included the times of goods trains too.

1283
CAIRNS RAILWAY.
TIME TABLE.

On and after MONDAY, 2nd January, 1888, the following Time Table for the Cairns Railway will come into operation and remain in force until further notice:—

Miles from Cairns.	Stations.	UP TRAINS.				Stations.	DOWN TRAINS.		
		Mixed. Mondays only.	Mixed. Wed., Thur., and Sat. only.	Mixed. Wed. only.	Mixed. Mon., Thur., and Sat. only.		Mixed. Mondays only.	Mixed. Wed., Thur., and Sat. only.	Mixed. Mo., Wed., Thur., and Sat. only.
5	CAIRNS ... dep.	a.m. 6:30	a.m. 9:0	p.m. 1:30	p.m. 4:30	REDLYNCH dep.	a.m. 7:30	a.m. 10:0	p.m. 5:30
5	Stratford ...	6:48	9:18	1:48	4:48	Richmond ...	7:34	10:4	5:34
7	Richmond ...	6:56	9:26	1:56	4:56	Stratford ...	7:42	10:12	5:42
8	REDLYNCH arr.	7:0	9:30	2:0	5:0	CAIRNS ... arr.	8:0	10:30	6:0

NOTE.—Passenger Fares between Cairns and Redlynch are reduced to 2s. First-class and 1s. 6d. Second-class.
F. CURNOW,
Commissioner for Railways' Office,
Brisbane, 14th December, 1887.

Trains in the tropics had been running for only 3 weeks when this timetable was published in December 1887. The stations have names— but when the railway opened, they didn't. Perhaps people were already disgruntled with the railway too—the Commissioner seems to have granted a reduction in fares.

space in the Gazette and because they were already typeset and available. Sometimes this had funny results. For example, in the late 1870s the timetable for Sunday trains on the Brisbane-Ipswich line was printed every few weeks, but the timetable for weekday trains did not appear for years.

As well as the one-off timetables for individual lines, the Government Gazette reprinted the entire system as Supplements at approximately monthly intervals from 2 October 1884 until 5 June 1889.

The remaining illustrations are of the Cairns Railway, which was selected to show the development of one line as depicted in the Government Gazette and the type of timetable information that can be obtained from it.

In 8 October 1887 the first section of the Cairns Railway opened for a mere eight miles (right). The names of the stations in this then undeveloped area had not even been selected – they are shown mundanely as “5-mile”, “7-mile” and “8-mile”. Note however that the intention from the beginning was to build the railway through to the mining centre of Herberton on the Atherton Tableland. Very soon, as shown in the illustration (page 5, bottom) of the timetable of 2 January 1888, the locations were named. 5-mile is now Stratford, 7-mile is Richmond and 8-mile is Redlynch. The final illustration (below) is of the timetable of 20 October 1888 when the railway had been extended just one more mile to Kamerunga, later renamed Jungara. The next section comprised the very difficult ascent of the ranges and was opened to Myola in 1891, but unfortunately by then railway timetables were no longer printed in the Government Gazette.

QUEENSLAND NORTHERN RAILWAY.

TIME TABLE—SUNDAY TRAINS.

ON SUNDAY, 6th November, 1887, the following Time Table will come into operation between Charters Towers and Macrossan Bridge, and will be in operation on every alternate Sunday until further notice:—

DOWN.			P.M.		
Charters Towers	...	depart	1:30		
Plum Tree Flat	...	...	A1:43		
Triangle	...	...	A2:4		
Burdekin Tank	...	...	A2:10		
Macrossan Bridge	...	arrive	2:15		
UP.			P.M.		
Macrossan Bridge	...	depart	5:0		
Burdekin Tank	...	...	A5:4		
Triangle	...	...	A5:11		
Plum Tree Flat	...	...	A5:32		
Charters Towers	...	arrive	5:45		

NOTE.—Excursion tickets will be issued by clerk accompanying each train for the purpose.

FARES.

Charters Towers and Macrossan Bridge—

	s.	d.
First Class	...	2 6
Second Class (or covered carriages)	...	1 6

Ordinary fares to and from all other places mentioned on this Time Table.

A Trains stop to pick up and set down passengers on giving notice to guard.

F. CURNOW,
Commissioner for Railways.

Commissioner for Railways' Office,
Brisbane, 21st November, 1887.

Commissioner for Railways' Office,
Brisbane, 14th October, 1887.

OPENING OF THE FIRST SECTION OF THE CAIRNS TO HERBERTON RAILWAY.

THE First Section of the Cairns to Herberton Railway, a distance of 8 miles, was opened for Public Traffic on SATURDAY, 8th October, 1887, and until further notice, Trains will run to the following Time Table, on two days in each week, viz.,—Tuesday and Saturday:—

UP.			A.M.			P.M.		
Cairns	...	dep.	9:0	4:0				
5-Mile	...	...	9:18	4:18				
7-Mile	...	...	9:26	4:26				
8-Mile	...	arr.	9:30	4:30				
DOWN.			A.M.			P.M.		
8-Mile	...	dep.	10:0	5:0				
7-Mile	...	...	10:4	5:4				
5-Mile	...	...	10:12	5:12				
Cairns	...	arr.	10:30	5:30				

The Fares for Passengers will be—

	1st.	2nd
	s. d.	s. d.
Between Cairns and 8-Mile	3 0	2 0

Intermediate Stations at proportionate rates.

Children under 3 years, in charge of parents or guardians, free; 3 years to 12 years, half fare; above 12 years, full fare.

TIME TABLE.

ON and after SATURDAY, 20th October, 1888, the following Time Table for the Cairns Railway will come into operation and remain in force until further notice:—

UP TRAINS.					DOWN TRAINS.					
Miles from Cairns.	Stations.	Mixed. Mondays only.	Mixed. Tu., Wed., Th., Fri., and Sat. only.	Mixed. Daily.	Stations.	Mixed. Mondays only.	Mixed. Tu., Wed., Th., Fri., and Sat. only.	Mixed. Daily.	—	
...	CAIRNS	dep.	a.m. 6:30	a.m. 7:45	p.m. 5:0	KAMERUNGA	dep.	a.m. 7:40	a.m. 8:55	p.m. 6:10
3	Edge Hill	...	d 6:41	d 7:56	d 5:11	Redlynch	{ arr. 7:47	9:2	6:17	...
5	Stratford	...	d 6:48	d 8:3	d 5:18	{ dep. 7:55	9:10	6:25	...	
6	Lily Bank	...	d 6:52	d 8:7	d 5:22	Richmond	...	d 7:59	d 9:14	d 6:29
7	Richmond	...	d 6:56	d 8:11	d 5:26	Lily Bank	...	d 8:3	d 9:18	d 6:33
8	Redlynch	{ arr. 7:0	8:15	5:30	Stratford	...	d 8:7	d 9:22	d 6:37	
9	KAMERUNGA	{ dep. 7:10	8:25	5:40	Edge Hill...	...	d 8:14	d 9:29	d 6:44	
		arr. 7:17	8:32	5:47	CAIRNS	...	arr. 8:25	9:40	6:55	

Trains stop when required. Time of departure is approximate only.

NOTE.—Passenger Fares between Cairns and Kamerunga, 2s. 6d. 1st class, single; 1s. 10d. 2nd class, single. Freight on General Goods, 15s. per ton.

F. CURNOW,
Commissioner for Railways.

Commissioner for Railways' Office,
Brisbane, 19th October, 1888.

(Above) The earliest Cairns railway timetable, at opening. The stations are yet to be named.

(Left) The Cairns railway, 11 months after initial opening—and one mile longer. Now we have names.

An Italian lesson in timetable reading

EISSO ATZEMA and GEOFF LAMBERT point out that Europeans were—and still are—taught the art of graphical timetable reading in school. They illustrate their assertion with an Italian State Railways Public Time Table of 1906.

The amazing public train graph which forms the focus of this article and appears on this month's cover came to light through a chain of events that started out with the publishing of the article on the world's first graphical timetable some years ago in the Times by the second author⁰. The first author of this note, a historian of mathematics at the University of Maine, studying the history of teaching of mathematics, learned of this article through an internet search and sent an e-mail seeking further information. In the ensuing exchange of e-mails he pointed the second author to an amazing website on which was some 40 pages of graphical public timetables which were published in booklet form in 1906 and that now has both of us mesmerized¹.

An official publication of the newly created Italian National Railways (FS = Ferrovie dello Stato)ⁱⁱ, the booklet covers the schedules of all of the public railroad tracks north of Rome as well as of what probably were private tracks (the blocked lines on the chart) from September 15, 1906 to September 15, 1907.

In addition, the booklet offers maps depicting all the tracks north of Rome (our page 12) as well as a colored cover and inside illustrations (our cover, and right—the original cab-forward locomotive). Although artwork in railroad publication was nothing unusual at the time, even today the cover and inside illustrations are rather striking. In fact, Danesi, the Rome-based company mentioned at the bottom of the cover illustration, was Italy's leading colored postcard company

and the publisher of highly-praised (and expensive) facsimiles of art work. In short, one wonders what the background to the publication of these graphical timetables might have been.

To be sure, these tables were by no means intended to replace the usual tabular time tables. Throughout the 1900s and 1910s, in its famous *Handbooks for Travelers*, the Leipzig-based Karl Baedeker firm consistently recommended the *Orario Ufficiale delle Strade Ferrate*, published by the Fratelli Pozzo in Turin as the most reliable source of information on train schedules in (northern) Italy. It is not even clear whether this booklet of 1906 was a one-time shot on the occasion of, say, the creation of the FS or whether similar graphical time tables were published on a regular basis. No counterpart for the tracks south of Rome has been found, neither has any other

similar booklet been located.

In this article, we provide a context to the booklet. While this context might take away part of the mystery of the booklet, we hope that the new light this note sheds on the use of time tables will provide some food for thought.

Essentially, we argue that the publication of this booklet almost certainly was not as unusual as it would seem to us now. Public graphical time tables, at least for just a few specific tracks, were not all that rare around 1900, particularly not in the German-language part of Europe and its direct influence sphere. The Verein Dampfbahn Bern, for instance, sells reproductions of a printed, poster-size graphical train schedule of 1880 for the six different tracks served by the Schweizerische Centralbahnⁱⁱⁱ. Surely not coincidentally, these train graphs are very similar to the train graph for the line between Münden and Göttingen of 1904 that Funkhouser included in his article on graphical representations^{iv}. At the very least this seems to indicate that the general public might have been much more familiar with the concept of a train graph than it would be today. Another indication for this comes from a somewhat unexpected source, namely the teaching of mathematics around 1900. As we will see below, at the time graphical time tables were used in the teaching of mathematics to illustrate specific mathematical concepts. Such a use of train graphs presumes that educators were familiar with the concept. Also, by singling out specifically this kind of graph over other kinds, there



regional tourism organisations often funded these, and, sometimes little expense was spared. They nearly all seemed to be designed for top end machines and I suspect that many of them in the travel trade ended up in the WPB after they caused installation errors, Microsoft hang-ups and other disasters.

There was brief attempt by some companies to distribute timetables and airfares by Spreadsheet. These would be accompanied by regular updates which needed to be incorporated into the original spreadsheet; this was probably expecting too much of the technical skills at most agencies and had a very short life. I remember a spreadsheet from either McCaffertys or Greyhound (before they became one) which required a Ph.D. in Timetable Comprehension to understand it.

Over the last two or so years there has been a heavy conversion of faxing into industry e-mails (obviously a great cost saver) and establishment of password accessed Internet sites for such things as nett airfares etc. Often these two means are combined and agencies

will receive an e-mail telling them of a new special – “for full details see [Many e-mails are now sent with either Microsoft Notepad or Adobe Acrobat reader attachments containing the main information. The e-mail itself usually just says “details of our wonderful new service from Gular Platform to Gulargambone, together with fares, is attached.”](http://etc.””</p>
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Most of the material that we get is from trade wholesalers so tends to be packages. But many airlines are now sending out regular newsletters containing various information, including timetables and fares.

The only Australian surface transport operators who are using e-mails are McCaffertys (sample Word files and Excel spreadsheets are shown on pages 8 to 10) and GSR. All updates from these two are now arriving by e-mail. Both are still issuing full timetables, but McCaffertys appear (without making an announcement) to have abandoned their fare manual, presumably in cost grounds. The McCaffertys/

Greyhound timetable has only seemed to be in very limited quantities for some time.

My own use of this material is as follows –

First I supply copies of all relevant material received to both Albert Isaacs of AATC and Thomas Cook.

I retain relevant material for my own operations, often disposing of same when the next Cook's OTT turns up (incidentally the Cooks OTT is one of my major reference sources, as it is now the only comprehensive timetable for Australia and many other places.)

Some of the material I receive is now transferred directly to my own client Newsletter. I will shortly be establishing some e-mail distribution of material to my clients of short notice specials and the newsletter itself when nothing else is to be included in the regular mail-out.

(How much of this material ends up in the WPB, Recycling bin or the great electronic graveyard in the sky without anyone reading it is a matter better discussed elsewhere.)

Adobe's own web-site (<http://www.adobe.com>) to allow you to download this free software should you not have it already.

PDF documents can be made from almost any software that can produce printed or viewable material. The Times, for instance, is composed in Microsoft Publisher and converted to PDF format for loading onto the AATTC web-site and for sending direct to our print house. Documents can be long and detailed, with high resolution colour graphics– The Times on-line is in colour with 6000 dpi illustrations.

While PDF documents are highly

optimised to save on file space, a high-resolution, full-colour 16-page magazine like The Times can still occupy a significant amount of space and take time to download via a modem. The Times on-line currently ranges from less than 1 to over 6 megabytes– the latter might take up to an hour to download.

More and more actual timetables are now being made available over the world-wide web in .PDF format—Sydney Buses' *Better Buses East* timetables are recent examples— and The Times will review this method of timetable production in a future issue.

The Times on-line at last

After many promises—more than I can remember—The Times is at last on-line on the AATTC website. At <http://www.aattc.org.au>, you can find all issues of The Times between November 1999 and the most recent issue.

On-line copies of The Times are present as Acrobat Portable Document Format (.PDF) files. PDF, developed by Adobe® Systems, is an “open access” standard for document viewing and printing designed for use on any computer operating system. PDF documents can be read with Adobe's Acrobat Reader software— free software, available almost anywhere or from

Information distribution in the Travel Trade by electronic media.

TONY BAILEY, an AATTC member and travel agent, has forwarded us some documents in electronic form, representing the sort of thing a travel agent receives from a bus company these days.

For many years the main methods of information distribution to the travel trade have been threefold –

- 1) Through various computer reservation systems (CRS).
- 2) Fax or Faxstream Distribution
- 3) Hard copy distribution through either –

- 1) Specialist distribution companies – Travel Express, Travcour (now owned by DX.)

- 2) Postal distribution.



All of these methods involve the originating organisation in expense to achieve a desired result.

The coming of e-mail, and, to a

lesser extent, floppy discs and CDs has ended much of this. The effects have only been felt in the last two years or so, but electronic distribution has been around in the industry for at least 7 years.

Many of the earliest items seen were various destination floppies or CDs. Various Government or

(Continued on page 10)

Marketing Department, McCaffertys Management Pty Ltd
Level 7, 345 Ann Street, Brisbane Qld 4001
PH: 07 3329 7777, FAX: 07 3329 7701
ABN 59010195205 ACN 010195205

NEWSGRAM

22 May 2002 N/G MC192

TIMETABLE CHANGES

Dear Agent


Please be advised that timetables changes have occurred on the following Greyhound services.

EFFECTIVE IMMEDIATELY
GX210 Sydney to Brisbane - will now arrive Brisbane at 11.00pm
GX472 Brisbane to Sydney - will now service Lismore and Casino and arrive Sydney at 9.00am
GX475 Brisbane to Sydney - will no longer service Lismore and Casino

EFFECTIVE 7 JUNE 2002
GX219 Canberra to Sydney - New Service
GX259 Canberra to Sydney - will cease operation
GX258 Sydney to Canberra - will now depart Sydney at 2.45pm

Please find attached updated timetables for your reference. Should you have any queries or questions, please don't hesitate to contact Leanne Owens (National Sales Coordinator) on phone 07 33297777.

Regards


AMANDA FARR
NATIONAL SALES & MARKETING MANAGER

