

# SCHOLARS' CLUB BULLETIN

January, 1938

No. 6

## Why Discs Are On Suburban Trains

### THEY ARE GREAT HELP TO SIGNALMEN

If you have ever looked at the back of a train, you will have seen a plain white disc fixed on it. This disc has a hinge in the centre of it and can be folded in two. When it has been folded, it looks the same colour as the rest of the train. It is only when it is opened up that it looks white.

Have you ever wondered what that disc is there for? Of course you have! What boy or girl hasn't?

It is put there on the back of the guard's van to show signalmen that the train is complete. If a train went past a signal-box and the signal-

light, like the tail light of a motor car, and the signalman watches for that.

The electric trains which run on the suburban lines also carry another sort of disc which is known as the distinguishing head disc and indicates to the signalman which line the train is running on.

For instance, the disc you can see in the picture on this page, means that the train which is displaying it is for the Williamstown line. These signs can be seen easily at a distance, when the train is running through the railway yards, and they are a great help to the signalmen.

You see, the signalmen in the city signal boxes, for instance, have many lines and points to look after, and they have to work very rapidly sometimes—especially at the busy periods in the morning and evening, when trains are coming in and going out every few minutes. It is, therefore, necessary for them to be able to tell what platform or line a train has to be switched onto, while it is still too far off for them to be able to read the destination sign over the driver's cabin.

### A Few Facts About The Newport Workshops

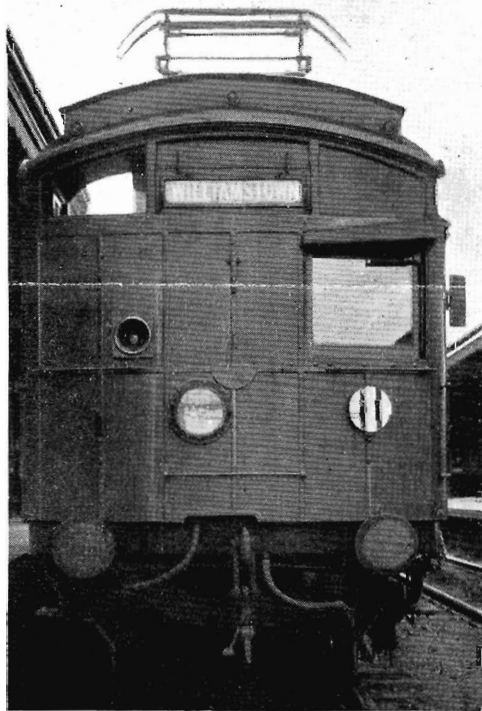
**M**OST of you have seen the Newport Railway workshops and you know that they are very large. Here are a few facts about them which will give you some idea of just how large they are.

The workshops extend over 130 acres. The buildings alone cover 22 acres, while the network of tracks covers a distance of 33 miles. There are 890 different machines in the shops. All are driven by electricity, and many of them have their own separate motors.

The number of men who work in the Newport Workshops is over 2,500. Among the many machines are four huge travelling cranes, which can each lift a load weighing 75 tons and carry it from one end of the shop to the other. There is another wonderful machine, which will turn out five tons of fishbolts in one day.

At Newport there are boiler shops, iron and steel foundries, coppersmiths' and blacksmiths' shops, forges and even a special section where they make the big tarpaulins that are used to cover open trucks in wet weather.

The men at Newport make scores of different things—from nuts and bolts to the huge 221-ton "Pacific" type locomotives, and from hammer handles to "Spirit of Progress."



man could not see a white disc on the last carriage, he would have the train stopped at the next signal-box and the guard questioned.

All trains carry these white discs—even a light engine would have one. At night, when the disc cannot be seen, the trains show a red

## Interesting Notes on Railway Signalling

**I** SUPPOSE you have often looked out of the window of your railway carriage and wondered how the driver of your train knows what the signals mean? Well, they mean safety, because they tell the driver when the line ahead of him is clear. Also they very often control points and by the signal displayed the driver is able to tell that the points have been set for the line on which he is to proceed. One of the most important kinds of signal is the "distant" signal.

This is a warning signal, which is placed some distance from the "home" signal and when at "proceed," gives the driver an early indication that all other signals are at "proceed."

Now, it may seem funny to have TWO signals, when it looks as though one would do, but there is a reason for it, and the reason is this:—when a train is travelling at a high speed, such as 60 or 70 miles per hour, which is the speed of "Spirit of Progress," it cannot stop dead.

The driver, therefore, must have plenty of warning so that he may slow down from his high speed and be ready to put on the brakes and stop if required. That is why we have the "distant" or warning signal. If the "distant" signal is against the driver, he must be prepared to stop at it if necessary; but if the line ahead is clear he will proceed cautiously to the "home" signal.

The "distant" is painted a different colour from the ordinary "stop" signal. The railways do not leave anything to chance. They believe in "SAFETY FIRST," and it is a rule which is strictly observed in all cases.

The next time you are travelling on a train and the train runs by a signal which is against it, you will know that you have passed a "distant" or warning signal, and that the driver is ready to slow down and stop.

## DEAR MEMBERS—

*A Happy New Year to you all! I suppose you are going away for your holidays, if you haven't gone already, and, of course, you will travel by train.*

*There are many lovely holiday places in Victoria, and the railways can carry you swiftly, comfortably and safely to everyone of them.*

*We have a lot of interesting stories for you in this month's issue of the Bulletin. There is the story of George Lynch, who is one of the four drivers who have charge of "Spirit of Progress" on its run between Melbourne and Albury.*

*There is a special story about signals. There is a story about rails . . . and . . . well, you read them for yourself.*

*I am always pleased to get letters from members of the club. Do not hesitate to write to me. If there are any special questions about railways, which you would like to ask me, write to me and I shall try to answer the questions for you in the Bulletin.*

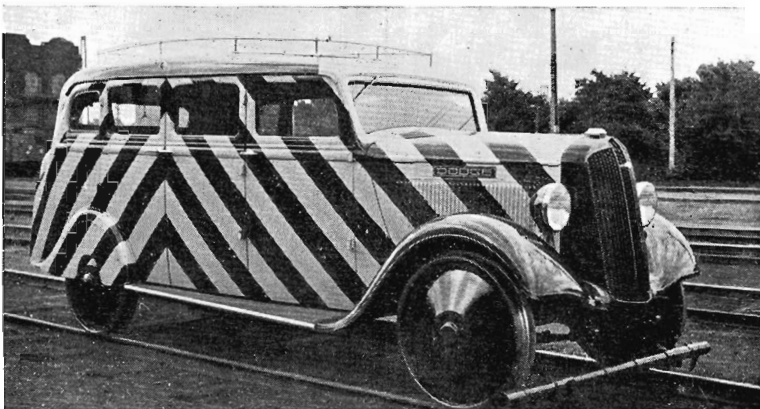
*By the way, Don Gray, of 112 Bridge Road, Richmond, wants a pen friend for stamp exchanging.*

*Again, all the best wishes for 1938, yours, etc.,*

*Bill Smith*

## 26,150 MILES OF RAILWAY!

**D** ID you know that there are more miles of railway line in Australasia than there are in Great Britain? Although railways were first built in England and some of the most famous trains in the world run on them, there are many other countries which have more miles of railway, because they are so much bigger. Australasia has a total of 26,150 miles of railway line, while England has only 23,760—a difference of 2,390 miles.



Here is one of the passenger-mail motors which run on country branch lines in Victoria. They each carry 10 passengers and a driver. With their yellow and black stripes these very comfortable vehicles can be seen a great distance away. As you can understand, that is a big advantage, particularly when approaching level crossings.

## Building Railway Lines Calls For Very Careful Planning

**I**F you have ever read stories about the railways, then you are certain to have seen the word "plate-layer," and to have wondered what it meant. Perhaps you thought—as I did once upon a time—that it meant the waiter, who lays the plates on the tables in the dining car!

**A**CTUALLY a "plate-layer" is a man, who looks after the track. And this is how he came to be called by such an unusual name. Nearly 200 years ago, and quite a long time before the first railway, roads were very rough and badly made. When the weather was bad carts used to get bogged in them, and goods and passengers used to be delayed.

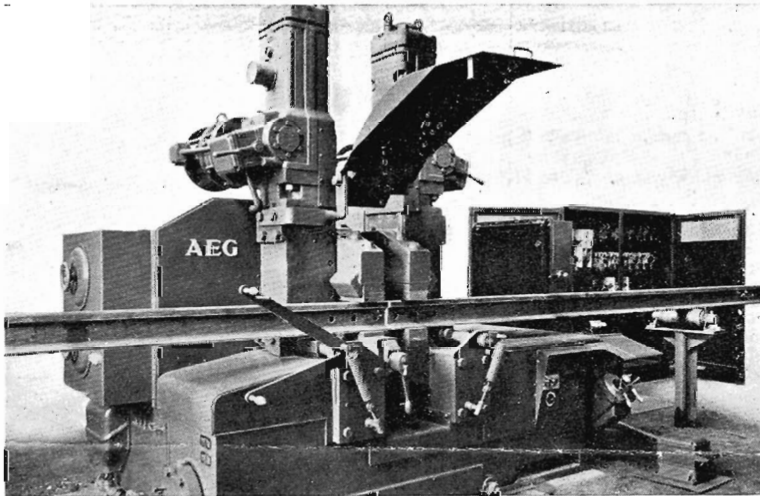
This was very annoying to people, who wanted their goods in a hurry, so they began to think of different ways in which the roads could be improved. They found that the best scheme was to make a WOODEN road. Later on these wooden roads used to be covered with flat iron plates, which made them wear longer, just as the plates on your shoes make them wear longer.

But these tracks were very narrow, and quite often the wheels of the carts would slip over the edge. In order to prevent this, special iron

machine, which is on this page, you will see just how this welding is done. The rails are placed in the machine, which is called a flash butt welder, and they are heated by electricity, until they melt together. When they are cooled again and the surplus metal is trimmed off, there is a perfect joint.

Have you ever thought of the careful planning that has to be done by the engineers, who build railway lines? Their job is one of the hardest that an engineer could be asked to do.

Railways are built in all sorts of strange places. For instance, there are the main lines through the Swiss Alps, which are 11,000 feet above sea level; there is a railway that runs for 100 miles across the sea to Key West off the Florida coast in the United States of America; and there are the wonderful Underground Railways in London.



Showing two rails clamped in the "jaws" of the automatic flash butt welding machine ready for welding. After the rails are adjusted in position, the weld is made in about two minutes. The machine weighs 11 tons.

plates with turned up edges were laid along the sides of the tracks. The men who laid them were called "plate-layers."

That was in 1776. In 1789 an Englishman named William Jessop invented the first iron rails. The men who laid them were still called "plate-layers," and so the name has come down to this day. From that time onwards rails were gradually improved. Engineers discovered ways of making them wear longer and carry trains more smoothly.

The most important discovery they made was that the longer the rails are the more smoothly the trains run, because there are fewer of those "clickety" joints for the train to go over. The rails which William Jessop made were only 3 feet long. On some of the railway lines in Victoria, the rails are welded into lengths of 225 feet. There are several experimental lengths of over 4,000 feet.

This welding is done by a very wonderful machine, which is installed at the Permanent Way Materials Depot at Spotswood.

If you will look closely at the picture of the

One of the most important things that engineers have to deal with in building railway lines is the question of hills or gradients. Gradients must be as flat as possible, because, when they are steep, trains cannot haul such heavy loads up them and cannot run so fast. And this means that passengers do not get to their destination so quickly.

So you can see how important it is that there should be as few hills as possible on the track the railway is to be built along. Of course cuttings, embankments, bridges and tunnels help to make the line flat, but they all cost a great deal of money.

So it follows that the engineers have to build their line in such a way that it will pass as conveniently as possible through all the big towns that need a railway to carry their passengers and goods. At the same time they have to build the line so that it is as flat as possible.

Is it any wonder that engineers, who design and build railways, hate hills?

## The Story Of A Boy Who Wanted To Be An Engine Driver

**H**ERE is the story of a small boy, who wanted to be an engine driver. His name is George Lynch and he lived up country at St. Arnaud. George's father was a railwayman and they lived near the line. George was always watching the trains go by, or was making little model trains for himself. He made up his mind that one day HE would be an engine-driver and perhaps drive one of the great big locomotives that used to rush by his home with a shrill whistle, trailing a long feathery plume of smoke and steam, and hauling big loads of passengers and freight.

**T**HE older he grew the more determined he became. As soon as he was old enough he got a job as a cleaner. George worked hard as a cleaner, and as he worked he began to learn about the engines. He got to know the various parts. He learned to wash out the engines. And he learned to lay and light the fire in the furnace.

Soon after this he passed his first examination. This meant that he could go out on an engine as a fireman. He was on his way to being a driver. George was a fireman for several years. But all the time he was learning more and more about engines, and about the wonderful Westinghouse air-brakes, which are on all our trains.

Then he was allowed to sit for another examination, which would qualify him to be a driver. He passed it easily. He was a driver at last.

### Becomes a Driver

But George did not stop there. He went on learning and working as hard as ever, and finally he became one of the drivers on the Melbourne-Albury section of the Sydney Express. There are four drivers and they take it in turns.

George Lynch was the first driver to take "Spirit of Progress" on its non-stop run to Albury. Let him tell you something about his job in his own words.

He says :—"An engine driver must be perfectly fit. He must have good eyesight and hearing, and he must not be colour blind, because the colours of lights and signals are most important. A driver must know every inch and curve on his run. And he must be able to 'nurse' his engine and get the most out of it.

"On the Albury run we burn between  $4\frac{1}{2}$  and 5 tons of coal and turn about 10,000 gallons of water into steam. Sometimes it is easy going—when we have a following wind. But a head-wind makes it hard work. It's then that you have to drive her, and that's the test of good driving—management and judgment.

"You see, on the run down to Melbourne, we pass through Benalla at 9.12 in the morning and we are due at Seymour at 10.10. That's 58 minutes and the distance is 60 miles. We've got to cover that distance at 60 miles an hour.

"But headwind or no headwind we always reach Melbourne on time. It's a great life. I wouldn't change jobs with anybody in the world!"

### 60 Different Grades of Workmen on Construction of "Spirit of Progress"

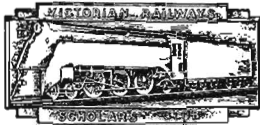
**I**F you were lucky enough to see "Spirit of Progress," when it was on display at Spencer Street station, you may have wondered how many men it took to make such a wonderful train. Can you guess? Nearly, 1000 men!

Well, in addition to all the outside people, such as architects and artists who were employed, there were no fewer than 60 different grades from the Newport Workshops alone. Each did his bit towards making "Spirit of Progress," the finest train in the world.

Among that 60 there were many unusual sorts of tradesmen such as saw-doctors, leather-workers, rope-splicers and even a sail-maker. So you can understand why every railway man is proud of "Spirit of Progress." Practically every department in the railways has had SOMETHING to do with this magnificent train!



**A** PEEP inside the Victorian Railways buffet car which has been in running on the Melbourne-Bendigo line since April last. It is air-conditioned—and that means a nice temperature inside the car no matter what the weather is like outside. Grills, entrees, soups, light refreshments, fruit juice and milk drinks... these are all quickly served while the train speeds along. No wonder railway travellers like the buffet car!



# SCHOLARS' CLUB BULLETIN

February, 1938

No. 7

## REAL MINIATURE RAILWAYS OVERSEAS . . !

**H**AVE you ever thought of how nice it would be to have a model train that was large enough to carry passengers? What girl or boy hasn't? Well, I'm going to tell you of two such railways in England. These miniature railways are not the sort that you see at the beach carnivals or the sort that run around on a circular track and which you pay threepence to ride. They are **REAL** railways and carry freight and passengers.

The older of the two is the Ravenglass and Eskdale Railway in Cumberland. This line was built first on a 2 ft. 9 in. gauge to haul iron ore from some big mines but it did not pay and for a long while it was abandoned. In 1916, however, it was converted to a 15 in. gauge and worked by small, model express locomotives.

These locomotives are exact models of full sized tender engines and are built very carefully to scale. There are three of them altogether. Two of them are models of the "Pacific" type of locomotive and are built to a scale of 3 inches to the foot, which makes them about one-quarter of the size of one of the locomotives hauling the big new Victorian train, "Spirit of Progress," and the other is a 2-8-2 or "Mountain" type, which is built to a scale of 4 inches to the foot, and is about one-third of the size of the full-sized engine. Each of these engines can haul about 200 passengers in the special light coaches that are used.

This railway, also, carries a great deal of broken stone. This traffic is handled by several powerful petrol tractors, which are really motor-lorry engines, that have been specially altered. One of these tractors can haul a load of 35 tons. Special, high-capacity bogie trucks are used

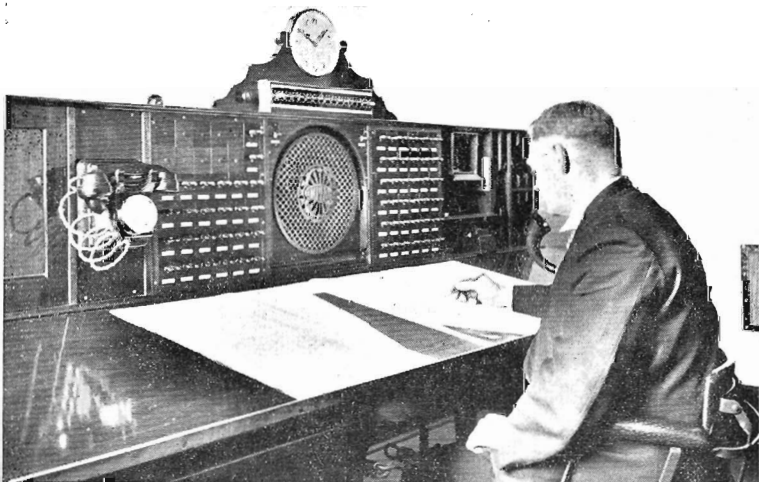
for hauling this stone. Each truck can hold 6 tons of broken stone and weighs  $2\frac{1}{2}$  tons when it is empty.

The second of these two miniature railways is also a 15 in. gauge railway and was first opened in 1927. It runs along the South coast of England between the towns of Dungeness, New Romney, Dymchurch and Hythe. It is a very modern and up-to-date railway. It has a double line throughout, has all the proper signals, and four handsome stations . . . one station at each town.

Two of these stations have "all-over" roofs and can handle a very large number of passengers. At busy times, passenger trains are run on this line, which consist of from 17 to 20 vehicles, and which can carry from 130 to 160 people. There are seven locomotives used on this line. Five of them are fine-scale models of the "Pacific" type of engine and two are the larger "Mountain" or 4-8-2 type. Each engine and tender weighs eight tons and the maximum speeds, at which they can run, are over 30 miles per hour.

There are two tunnels on the run, each of which is six feet high, and there is even a 50-ft. span lattice-girder bridge.

In its first month this tiny railway carried 75,000 passengers.



A Train Despatcher at work. Facing him on the board in front are the switches which he turns to give him connection with the various stations. On the desk before him is the graph on which he records the movements of trains.

(See Page 4 for Story.)

## — Grand, New Competition For Members —

### A Railway Bogie Is—

**I**N one or two places in this month's Bulletin, the word "bogie" is used in connection with locomotives, tenders or passenger cars.

On locomotives the "bogie" is the four-wheeled carrying truck which you can see at the front of the locomotive. It not only carries the weight of the front part of the locomotive but acts as the "pathfinder," guiding the locomotive over points and crossings along the route set up by the signalmen.

Two bogies are usually used under a tender or a carriage and each one may have four or six wheels. The bogies under tenders carry the weight of the body of the tender and of the coal and water it contains, while under carriages a bogie is fitted at either end and each one carries half the entire weight of the body of the carriage and of the passengers it contains.

A bogie is attached to the underframe of a vehicle by a large diameter pin around which it swings or pivots.

### DEAR MEMBERS—

**I**SUPPOSE holidays are over for most of you by now, but I hope that you have enjoyed them. Did you go away? If you did, you travelled by train, of course. In fact, I may have driven some of you. I hope so. Whenever my train glides into a station and I can see any boys or girls on the platform, I always look for the scholar's club badge, and I'm glad to say, that I have been seeing more and more of them lately.

\* \* \*

Now just a word or two about this month's issue. We've got some very good stories for you. In fact, we had so many good stories that I've had to hold a few over until next month. If the words "bogie" and "gauge" and figures such as 4-6-2 in the story about miniature railways are a little strange to you, don't worry, because we've explained them all on other pages of this issue.

I am glad to see that more and more members are asking for pen-friends and are writing in to me. I am always glad to hear from you, so don't be afraid to write.

\* \* \*

I hope that you will all be entering for the competition, which is being run by Nancy Lee in 3AW's Chatterbox Corner.

I'd like to enter myself, as I have a very nice railway scrap-book, but I'm afraid that I'm just a trifle over the age limit . . . so it's up to you. I see that Ken, Owen of Oakleigh is looking for a pen pal who is interested in the history of the Victorian Railways. I wonder what Ken's scrap-book is like. Ah well, we'll soon know. In the meantime, I'll have to wave you all goodbye, until next month.

Your Pen Pal,

*Bill Smith*

### START YOUR SCRAP-BOOK NOW

**H**ERE is good news for all you members of the Scholar's Club! Nancy Lee of 3AW's Chatterbox Corner is running a splendid competition for the best Railway Scrap-book. The scrap-book must be about railways only, and must be sent into 3AW, 382 Latrobe Street, Melbourne, C1, before the end of March.

This gives you plenty of time to collect interesting paragraphs and pictures from newspapers and magazines and paste them neatly in your book. If you have any photographs of trains which you have taken yourself, be sure and paste them in your scrap-book, too. 3AW is offering a cash prize of £1/1/- for the best scrap-book submitted.

You have two months in which to collect the material for your book, so get to work right away and remember, your book **MUST** be at 3AW by the end of March.

### Pen Friends Through Scholars' Bulletin

**T**HIS is only the seventh issue of the Bulletin, and already the number of club members has grown to just on 5,000. This is good news, but even better is the news that club members are getting to know each other by starting pen friendships. Each week Bill Smith is receiving more and more letters from club members who wish to correspond with other members. And he wants to say how pleased he is that this is happening.

If you have any hobbies, such as stamp collecting, for instance, and would like to exchange with another member just send your name and address and all particulars to Bill Smith and it will be printed in the next issue of the Bulletin.

Now here is a little list of members, who have done this:—

Ralph Doherty, 2 Regent Street, Oakleigh, SE12, would like a pen pal aged 12 to 13 years.

Merle Franz, 18 Bass Street, Box Hill, E11, wants a pen pal about 15 years of age.

D. Kerr, 108 Severn Street, Box Hill, E11, wants a pen friend 15-16 years of age.

Keith M. Buck, 211 Arthur Street, Fairfield, wants to exchange stamps with members.

Ken, Owen, 12 The Avenue, Oakleigh, SE12, would like to hear from members, who are interested in the history of the Victorian Railways.

Finally, if there are any questions you would like to ask about railways or anything connected with them, don't hesitate to write to Bill Smith. He is always pleased to hear from members and tell them anything they would like to know.



## Loading Rail Trucks

### THINGS THAT MUST BE CAREFULLY WATCHED

**K**EVIN Williams loved travelling in the train. There was always so much to see. From the moment the train pulled out of the platform at Spencer Street, he had sat with his eyes almost glued to the window. When he got tired of sitting, which he did fairly often, he would go and stand in the corridor and look out on that side, until he felt like sitting down again.

This time he happened to be standing in the corridor, and as the train pulled out of a country station he saw another of the mysterious things, that had made him wonder to himself almost ever since the train had left Melbourne. "Hullo!", he said to himself, "There's another of them!"

"Another what?", said a voice behind him.



"You mean the loading gauge," the train conductor said.

"Is that what it is?", said Kevin. "How does it work?"

"Well," said the conductor, "When the men in the yard have finished loading a truck, they run it under the gauge. If the truck runs under it without any of the goods on it hitting the gauge, then the men know that the load will clear the bridges and tunnels that the truck will have to pass under on its journey."

"Oh!", said Kevin, "I wondered what they were for."

"Here's another interesting bit of news," said the conductor. "Did you know that locomotives and coaches cannot be built any higher

than the distance between the top of the loading gauge and the rails?"

"No," said Kevin. "Why?"

"Well," said the conductor, "bridges, tunnels, platforms and all those sort of things cost a great deal of money. And the bigger they are the more money they cost. So, when people build a railway, they try to make all those things just large enough to give the best results, but not too large. So they decide on a height for the tunnels and a width for the rails and bridges and everything and build them all to the same measurements. This is called the "construction gauge," and anything that will fit the loading gauge will fit the construction gauge. If carriages and locomotives were built higher and wider than the loading gauge, they wouldn't be able to pass through tunnels or run alongside platforms. But as things are, everything is just right."

## 4-6-2...?

**I** SUPPOSE that many members of the Scholar's Club have wondered, as I have done, about the meaning of the mysterious figures, which are often printed in the description of a type of locomotive.

For instance, the 4-6-2 or "Pacific" type of locomotive hauls the celebrated "Spirit of Progress" between Melbourne and Albury. Do you know what the figures 4-6-2 stand for? Some of you may, but for those of you who don't, this little paragraph or so has been written.

The figures 4-6-2 stand for the number of wheels on the locomotive. They are divided into three groups. First come the four bogie wheels on the very front of the engine—two on each side—then come the six big driving wheels—three on each side—and finally two small trailing wheels—one on each side.

The number and arrangement of wheels varies with the different types of locomotive. For instance, you may read of 4-6-0, 0-6-0 and even 0-8-0 locomotives.

The number of wheels on a locomotive usually depends on the job it has to do. Big engines weigh a great many tons and the weight is divided among the axles. Each axle can carry a load of only so many tons. The more axles there are, the less load each axle has to carry. But the heavier the load on the axle of the driving wheels the better the wheels grip the rails. This means that they give the engine a stronger push along. So when engineers are designing a locomotive they try to arrange the axle-loads so that the train will be most efficient. They put most of the weight on the driving wheels and only have as many extra wheels as are necessary to prevent the axles of the driving wheels from breaking under the strain.

The 0-8-0 type of engine is what is called a "switching" engine. It is an engine that is used or shunting in the yards. In order to do this it must have a very strong push—you know how hard it is to start something rolling, though it is easy enough to keep it rolling once it is started. For this reason all the weight of the engine is put on the eight driving wheels. Because of this the engine can start quickly with a very heavy load and shunt it after only a short run.

## The Importance of the Train Despatcher in Efficient Train Running

**H**AVE you ever heard of the Train Despatcher? Very few people have. And yet the train despatcher has one of the most important jobs in the railway system. It is his job to see that trains get in on time and that there are no delays. He is responsible for the movements of every train in his district.

Come with me and let us see him at work. We find him in the Railways Administrative Offices at Spencer Street. He sits by himself in a special room, which is absolutely sound-proof. This room is air-conditioned, so that the train despatcher works in perfect comfort no matter whether it is hot or cold outside.

Of course, one man could not attend to ALL the railway lines in Victoria. So the system is divided up into districts, and there is one man in charge of each district. For instance, there is the North-Eastern District, which contains the Melbourne-Albury line on which "SPIRIT OF PROGRESS" runs, as well as several other long country lines.

Let us watch the despatcher for the North-Eastern Division. He is seated at a sort of sloping desk in front of a huge and complicated looking switchboard. This switchboard is one of the most wonderful things in the entire railway system. On it there is a switch for every railway station in the division, and the despatcher has only to turn the switch and he is connected immediately with the station he is calling. He does not have to dial a number as we do, when we make a telephone call, or ask to be put through. He merely turns the switch and the marvellous machine, which is set up in another room does the work for him. A special light set in the top of the board flashes a number of times as the call goes out, and the next minute he is through.

### Graph Explained

This wonderful telephone is called the "selectorphone," and instead of having earphones it has a special loud-speaker.

Now, just before we hear the train despatcher at work, let us look at the thing he has on the desk in front of him. It is a large plan or graph covered with ruled lines. Across the top of these lines are numbers, which stand for the hours and minutes of the day, while down the side of it are printed the names of the different stations on the line. On this plan the train despatcher draws a sort of map of the journey of each train, and this map enables him to tell at a glance, just where any particular train is at any particular time, and whether it is running on time or not. These plans look very complicated to us, but the train despatcher can read them just as easily as you and I can read the "Bulletin."

There may be as many as five or six different trains at various places on the line at once, so you can see that the train despatcher has a very difficult task especially, if some of the trains are running express. Let us see just how he does it. There is a call coming through now. The train despatcher presses a switch and speaks into his mouth-piece. He says, "Who is speaking?" and the reply is "Albury speaking."

"What is it Albury?"

"Spirit of Progress" has left here on time. Albury finished."

"All right! Finish Albury."

You see, the train despatcher has so much to do, that he cannot waste time in saying "Hullo! How are you?" or "Isn't the weather fine?" or any little chatty things like that. He has to get straight to business and so has the Stationmaster at Albury. Now ALL the train despatcher's calls have to come through that loud-speaker. So when the Stationmaster at Albury rings, he waits until the train despatcher tells him to speak, as somebody else may be speaking through the loud-speaker at the same time. And when he has finished what he has to say, instead of ringing off, he waits to see, if the train despatcher has any order for him. If the train despatcher hasn't any orders, he says "Finish Albury!" and the Stationmaster at Albury hangs up.

The train despatcher then makes a mark on his graph to show that "SPIRIT OF PROGRESS" has left Albury on time. And in this way he keeps in touch with "SPIRIT OF PROGRESS" and every other train on the line from station to station until they reach their destinations.

In addition to this the train despatcher knows the number of trucks and carriages on every train, the total number of tons that the train weighs, the number of first and second class passengers on board, and the name of the driver and the guard. Every train in his district is known to the train despatcher by a number. Even numbers for "up" trains—that is trains to Melbourne—and odd numbers for "down" trains—that is trains from Melbourne.

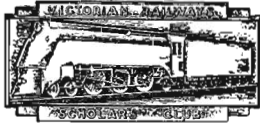
## NOW YOU KNOW WHAT "RAILWAY GAUGE" MEANS

**E**VERYONE has heard the word "gauge" used about railways. We hear of narrow-gauge railways and broad-gauge railways, but not everyone knows what the gauge of a railway is.

It is the distance between the running sides of the head of the rails, and it varies in different countries from 2 feet to 5 feet 6 inches. In England and in many parts of Europe the gauge is 4 feet 8½ inches. In Victoria, it is 5 feet 3 inches. Any gauge less than 4 feet 8½ inches is regarded as narrow-gauge.

Wider gauges mean that bigger and more powerful locomotives and more comfortable carriages can be used, and that trains can be run at higher speeds. Narrow-gauge railways cannot carry passengers in safety and comfort at very high speeds, particularly on curves. That is why we should be glad that we have such a broad-gauge in Victoria, as it means that we can run big and comfortable trains like SPIRIT OF PROGRESS at speeds of up to 70 miles per hour with perfect safety.





# SCHOLARS' CLUB BULLETIN

March, 1938

No. 8

## How's That Railway Scrapbook Of Yours?

### NEW BUFFET CARS FOR VICTORIAN RAILWAYS

**A**FTER Safety, the two things that the railways aim for are Comfort and Speed. They want to carry all passengers to their destination as quickly and as comfortably as they possibly can. They try to do this always, but people have to eat and so—on long journeys—stops of as much as 30 minutes have to be made at certain stations so that the passengers can take refreshments.

Trains running between Melbourne and Bendigo and between Melbourne and Albury no longer need to make these long stops, because the passengers are able to eat in comfort in buffet cars. The railways are also building four new Cor-ten steel buffet cars—and are converting two carriages for buffet purposes. These will run on the North-Eastern, North-Western, South-Western, Eastern and Mildura lines. The new cars will be constructed of Cor-ten steel—the same steel that "Spirit of Progress" is built of. It combines great strength with extreme lightness.

Just think of it! In future, when you travel on one of these lines, you won't have to scramble

### DID YOU LOSE YOUR BADGE ?

**F**ROM Longwarry North, Gippsland, has arrived one of the Scholars' Club badges. It was found there. I have it awaiting the member who owns it. Did you lose your badge? If so, let me know—my address is—Bill Smith, c/o Betterment and Publicity Board, Railway Offices, Spencer Street, Melbourne, C1.

out of the train and run to the station refreshment room for your meal; instead you will stroll along the corridor of the train to the smart, spotlessly clean buffet car, where you will sit in comfort on a high, modern chair by the long counter and eat your meal as the train rushes on towards the end of the journey.

You will be able to get ice cream on these new air-conditioned buffet cars, pure fruit drinks, sausages, chops, cakes, sandwiches, and a host of other lovely things to eat.

You can see therefore, that these new air-conditioned buffet cars are going to do two things for train travellers. They are going to allow them to eat in comfort while travelling, and they are going to lessen the train journey. In other words, they are going to mean greater comfort and speed and, thanks to the wonderful Cor-ten steel, greater safety.

### MUST BE IN BY MARCH 31

**H**ERE is a splendid chance for members of the "Scholars' Club" to build up their own history of railways in pictures. 3AW is offering a prize of one guinea for the boy or girl



Miss Nancy Lee,  
of 3AW Chatterbox  
Corner.

who compiles the best scrapbook containing all aspects of railways in Australia and elsewhere. The early days of England's first "puffing billy," the building of the great bridges that span the deep forests of Africa, "The Flying Scotsman," "Spirit of Progress" . . . you can tell the whole history of one of the most important forces of the world in your scrap-book. Collect your pictures now, paste them in any suitable plain book, and send the scrap-book in to 3AW before March 31.

### "Trip Gear" is Big Safety Feature on Railways

**T**HE motto of the railways is "Safety First." Everything possible is done to make sure that, when you travel by train, you travel in perfect safety. You have heard of automatic points and you know about signals, but have you ever heard of the "trip gear?" This is a marvellous invention, which you can see for yourself on suburban railway lines.

It is always placed close to a signal and its job is to stop any electric train from passing that signal when it is in the danger position. The way in which the "trip gear" works is this. Close to the signal is a sort of steel box with a short arm sticking out of it. This is right near the line, and the arm moves whenever the signal moves. When the signal is in the "safe" position the arm on the "trip gear" hangs down, but when the signal is in the danger position it sticks up.

Now, if a train comes along, when the signal is in the danger position and tries to pass it, the little arm on the "trip gear" would knock against a valve handle on the train and put all the Westinghouse airbrakes on the train into action.

This would stop the train instantly. So you can see, that the "trip gear" is really a very important thing in the safe running of trains.

## BILL SMITH IS GETTING MANY INTERESTING LETTERS FROM CLUB MEMBERS

**B**ILL Smith is glad to say that each month he is getting more and more letters from members who have answered his invitation to write in to him and ask him any questions they care to about railways.

These letters have been so interesting that Bill has asked us to publish them and the answers, too. Well, unfortunately lack of space won't permit us to publish them all, though we should like to do so. But we have picked out some, which we think will interest all members and we are going to print as much of them as we can.

Bill tells us that he has written to these members already, and will always try to write direct to any members who write to him.

Now the first letter we have here was from Ralph Doherty, of 2 Regent Street, Oakleigh. Ralph wanted to know among other things what a "booster" was. Well, a booster is really a small steam engine mounted on the trailing truck of the locomotive. When the locomotive needs more power to climb a hill, the steam is turned through the booster and the extra power is developed. The booster is used only when climbing with a heavy load. It cuts out automatically when the locomotive is travelling freely under its own power.

An excellent suggestion was made by James Douglas, of 46 Napier Street, Footscray, about

starting a Trip Fund. This suggestion will be seriously considered when we start our tours again.

Max Lowerson wrote from Rosebud, to ask Bill why we don't run passenger mail motors on the Eltham line. The answer is that the railway service right through to Hurstbridge is electrified and we never run mail motors where we can use an electric car. A mail motor holds only 10 passengers whilst an electric car holds 80.

Geoff. King, of 16 Beaconsfield Parade, Northcote, wanted to know about a red-brown engine "S300," which he saw in number 9 platform at Spencer Street. This locomotive is on the Melbourne-Albury run and hauls the Albury express. It can do 70 miles an hour easily, which is the greatest speed we allow on the track. Soon this engine will be streamlined, painted blue and gold and named "MATTHEW FLINDERS," when it will be ready to haul "Spirit of Progress."

Daryl Thomas wrote from Warrandyte Road, Ringwood, to say that he has joined the railway team as an apprentice fitter and turner. Daryl is the first of our members to join the Department and we all wish him the best of luck.

Well, we are unable to answer any more letters here this month, but we'll see what we can do again next month. Meanwhile, remember that whenever you write to Bill Smith he will answer your letter and questions direct.

### DEAR MEMBERS—

**W**E have such a host of interesting stories for you this month, that I am afraid my letter to you must be very short.

I want to say how glad I am that you are making pen friends among each other and especially that you are writing to me. If you haven't written to me yet, don't be shy. I am always glad to hear from members of the Scholars' Club, not forgetting those of you, who, like Daryl Thomas, have left school and have started work.

I hope that you will enjoy reading this month's issue of the Bulletin. We try each month to cram as much interesting news as we possibly can into each page of the Bulletin—even if it means cutting short my monthly talk with you.

*Bill Smith*

### PEN FRIENDS WANTED

Bill Williamson, of 40 Florence Street, North Williamstown, is interested in horses and drawing.

\* \* \*

Ron Hambleton, of 170 St. George's Road, Northcote, is keen on stamp collecting.

\* \* \*

Linda Millard, 24 John Street, Oakleigh, collects pictures of actors and actresses—particularly Shirley Temple.

### Speed Recorders on Locos. Explained Here

**M**ANY of you know what the speedometer on a motor car looks like, and you may have wondered if a railway locomotive has the same sort of thing for telling the driver the speed at which his train is travelling. Well, of course, a locomotive has a machine for recording its speed, but it is much different from the one you would see on a motor car. It not only shows the speed of the train at any particular time, but keeps a record of it too, by drawing a chart as the train rushes along.

Now there is a set time for every train on the line, as you know, and trains must get in on time, but there is also a speed limit for every part of the run, and that speed limit must not be exceeded, if the train is to make its journey safely.

For instance, if there is a very hilly stretch on the run, the driver will be told that he must not go down hill faster than a certain speed.

Engineers will have worked out the safest speeds for the different parts of the line and a chart will have been made of them on a speed recorder on a test train. This chart is called the master chart, and if the driver of a train has obeyed his orders and kept to the proper speeds on the different parts of the run, the chart made by his speed recorder will be the same as the master chart.

But if he has been exceeding the speed limit on certain parts of the track it will be shown on the chart of his speed recorder, which will be different from the master chart for that run.

In the picture on page 3 you can see just what the speed recorder on a locomotive looks like. This is just one of the many ways in which the railways make sure that everybody travels in safety always.

## Handling of Railways Goods Traffic Briefly Outlined

**I**N past issues of the "Bulletin" we have had many stories and articles about passenger trains, but never anything about goods trains, and so we have decided this month to tell you something about goods trains for a change. Let us watch the train being made up. First of all there are the different kinds of "goods," which have to be loaded. Chief of these are the livestock, that is, cattle, sheep, horses and so on; and the "perishables"—butter, milk, eggs, groceries, meat and other things that can go bad or spoil. After these two kinds of goods come others, such as iron, coal, heavy machinery and other things that do not spoil.

**N**OW the different kinds of goods are all sorted at different places in the railway yards. For instance, all light goods such as clothing and groceries are despatched from one shed. Rolls of barbed wire, machinery, scrap iron and so on are forwarded from a different part of the railway yard equipped with lifting cranes . . . And coal is loaded into the trucks direct from the ships.

These goods are all loaded into trucks, which are specially suited to them. Sheep are put into special sheep trucks . . . meat and butter are loaded into special refrigerating trucks . . . and so on. Goods travelling in open trucks are generally covered by a tarpaulin.

When all the trucks are loaded the goods they contain are weighed. This is done by an enormous weighing machine called a weighbridge. The truck, which is filled with goods is shunted onto the weighbridge and a note is taken of the weight.

Now the weight of every truck is painted on the side and is called the tare. If the tare is nine tons, we subtract it from the total weight of the truck and contents (25 tons), and there we have the weight of goods with which it is loaded (16 tons).

This weight together with a description of the goods and the name of the station to which they are being sent is written on a document called a waybill, which is usually clipped on to the truck.

### Marshalling Trucks

When the trucks have been weighed and the waybills made out, small shunting engines called "Pilot" engines collect them from the different parts of the yard and haul them to a certain point, where the goods train is being assembled.

Then the trucks are "marshalled." This means that they are assembled in the order that will make it easiest to shunt them, when the time comes for them to be shunted off the train.

They are placed in station order, the trucks that are to be detached at the first station along the line are placed nearest to the engine, so that they only need to be uncoupled from the main part of the train and shunted down a sideline by the engine without moving the rest of the train.

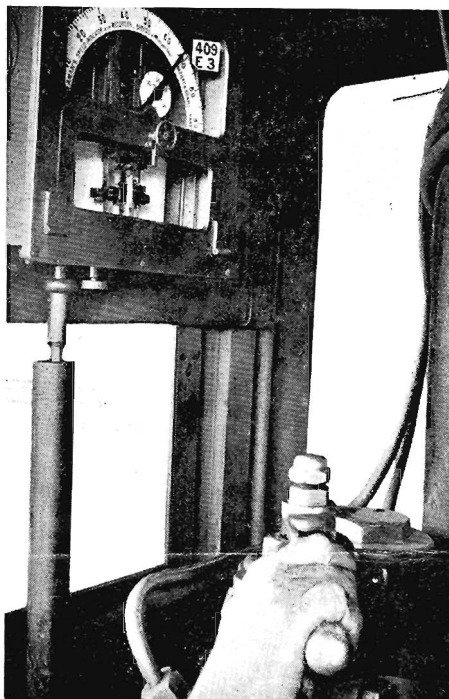
There are two kinds of goods trains. The first is called a "road-side" train. It puts off or picks up trucks at every station on the line. The second kind is called a "through" train. It carries goods for different districts and the trucks are "marshalled" in the order of the districts.

When the goods train has been "marshalled," the shunters make sure that it is the correct tonnage, because as you know a locomotive can only pull a certain number of tons, and as some locomotives are larger than others and can pull more, the shunter must be careful to see that the

load is the correct one.

At this time, the engine is attached to the train. This is about 35 or 40 minutes before the train leaves the yard. The train examiner then tests the brakes on all the trucks and inspects all the gear. Remember the Railway's motto is SAFETY FIRST. Next the engine driver on the train

### LOCOMOTIVE SPEED RECORDER



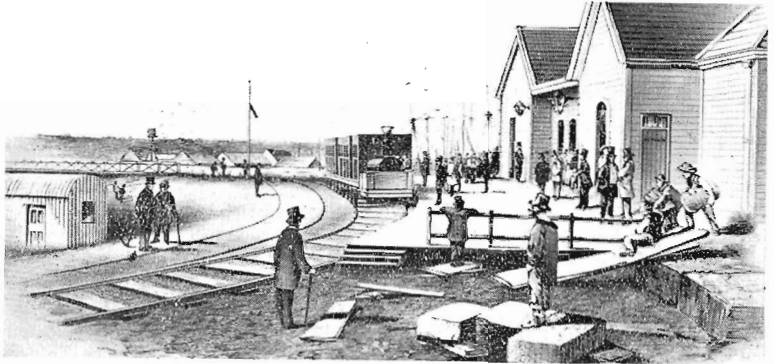
pumps air for the Westinghouse airbrakes right through the train and, after the train examiner has completed his inspection, the guard tests the brakes by operating the airbrake in his van.

The guard's test is carried out every time the train is broken—that is, every time the train stops at a station and shunts trucks on or off.

After the brakes have been tested, the guard has a look at the numbers and tonnage of the trucks, noting their destination and checking them all with the shunting staff. If everything is in order, the guard gives the all-clear signal, the engine driver sounds his whistle and the train pulls out of the yards and on to the track. The shunting staff have finished with her. The train despatcher about whom you read last month, has then taken charge.

# AUSTRALIA'S FIRST RAILWAY—83 YEARS AGO

HERE is a picture of the first railway in Victoria, a line from Melbourne to Sandridge, which was the old name for Port Melbourne. This line, opened by the Hobson's Bay Company on September 13, 1854, was the first railway to be operated in Australia. The locomotive, which was used to haul the first train was not a real one at all. Two railway locomotives had been ordered from England, but they did not arrive in time for the opening of the line, and so the company had to build an engine of some kind to use until the proper ones arrived. Although it was built in a great hurry, this engine was 30 horse-power and could haul a load of 130 tons at a speed of 25 miles an hour. There were first, second and third class carriages on the train. These were brought cut from England and were described in the newspapers at that time as "handsomely appointed and furnished and very commodious." The engine was used only for hauling passenger traffic. All the goods trains were hauled by horses.



## Functions of Home Signals

YOU will remember, that in January's Bulletin we learnt about DISTANT signals—the signals that are placed far up the line to warn drivers of fast trains that they must be prepared to stop at the next signal or to tell them that they may run through the station without stopping. Well, this month we are to learn about HOME SIGNALS.

The HOME signal is the first signal the driver of a train meets after passing the DISTANT signal. It is called the HOME signal, because it is near the signal-box or station, and is what is known as a STOP signal. Because it is a STOP signal, it has a square end to the arm and is painted RED with a WHITE band. This is done so that the driver will be able to tell it from the DISTANT signal, which has a V-shaped notch in the end of the arm and which is painted YELLOW with a BLACK band.

The job of a HOME signal is to protect a train, when it is standing at a station, from any train, which may be coming along behind it, and to protect level-crossing gates, point connections and junctions. Sometimes, too, HOME signals act as DIRECTING signals telling the driver of a train in what direction he is being sent.

If a HOME signal has to protect a level-crossing, or a set of points, it must be placed a good way up the line from the position it is required to protect, so that the train will be stopped before it comes too near the danger point. There MUST be a space of six feet between any two sets of lines, if trains are to pass on them. Anything LESS than six feet is regarded as FOULING the Main Line. So the point where the two lines come closer together than six feet is called the FOULING POINT. All signals must be placed farther up the line than the fouling place, which they are to protect.

A HOME signal is always placed within sight of the signalman, and a train standing

at it must be clearly seen from the signal-box.

Wherever it can be managed, a HOME signal is placed so that both the signal and a train standing at it can be clearly seen from the signal-box. When a train CANNOT be seen at the HOME signal, a special electrical instrument in the signal-box shows the signalman that it is there.

You can see from this that the railways leave nothing to chance. They do every single thing they can to make your journey by rail fast, comfortable and SAFE!

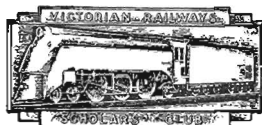
## DYNAMOMETER CAR HELPS IN MANY WAYS

WE have learned from our stories about the train despatcher's job and the graphs he uses. Now let us tell you about another sort of graph, which helps the railways to get the maximum amount of power and service from their locomotives—the graph which is drawn by the wonderful machinery of the Dynamometer or Power-measuring car.

The Dynamometer car is the watchdog of the railroad. Whenever a new type of engine is going to be used on a run, or the speed is going to be increased on a run, the Dynamometer car is hitched on behind the engine and taken over every inch of the course from start to finish.

While the engine is rushing on its way the machinery in the Dynamometer car is drawing a graph which shows how much horsepower the engine is developing . . . how much power it has in reserve when it is climbing hills, and the speed and possibilities of faster speeds.

You can see from this that this marvellous apparatus played a very important part in deciding the speeds at which "Spirit of Progress" runs over the different parts of its 190-mile non-stop journey between Melbourne and Albury. The Dynamometer car is owned by the Victorian and South Australian Railways.



# SCHOLARS' CLUB BULLETIN

April, 1938

No. 9

## Transport Through The Ages



**T**HIS picture takes us a long way back to the time before men had learned to tame horses and to ride upon them and use them for carrying and hauling goods. As you can see from the picture, boats had not been invented at that time and when people wanted to go anywhere they had to walk. Because they had to carry everything themselves, they could not hunt far away from their homes and they could not move freely from place to place and exchange goods with other people. Until there was some better way of carrying goods there could be no trade. From this you can see how important transport really is. Next month we shall show the next step in the improvement of transport.

## MORE MEMBERS WRITING TO BILL SMITH

**O**NCE again we have a few of the very many interesting letters which Bill Smith has received from members of the Scholars' Club. Before doing so, however, Bill Smith has asked us to remind readers that he is always pleased to hear from them. Remember, whenever you write to him, you will receive a letter back. So be sure and write to him, if there are any questions about railways and trains, which you would like him to answer.

The first letter we have here is from Frank Goldsworthy, of Caloona Avenue, Oakleigh. Frank's father and his two uncles are members of the railways' team and Frank says that he hopes to be someday. In the meantime, he is learning all he can about railways.

## DEAR MEMBERS—

**A**S usual we have a great number of very interesting things for you to read about in this month's Bulletin. For those of you who are interested in the history of the Victorian Railways, we have a special article. We also have a story about the Railways General Storehouse—a really wonderful place which many of you may have seen on the tours.

You'll read about some of the fastest trains in the world in this issue, too, and when you do, I want you to remember, that they wouldn't be able to run at such high speeds, if it weren't for those Westinghouse Automatic Air Brakes. I'll tell you about these Brakes in the next Bulletin.

I am glad to say that we are getting more and more new members for the Scholars' Club each month, and that most of them have been brought along by those who are members already. Also I am getting more and more letters from members each month. Believe me, it's nice to know that I've got so many pen pals, who are interested in railways. I like my job and I'm always pleased to answer questions. So keep on asking them!

There's another Bill in the railway team. Bill Williams—a member of the Scholars' Club. Good luck, Bill! I know you'll like your job. Well, I've got a job to do myself, so I'll say goodbye until next month.

Your Pen Pal . . .

*Bill Smith*

George Scott, of Seddon Street, Seddon, wanted to know if the Railways Scrap Book which he entered for the 3AW Chatterbox Corner competition would be given to the hospital afterwards, as he wanted to keep his copies of the Bulletin. It might be a good plan to keep your copies of the Bulletin and have them bound into a set. Many members of the Scholars' Club are doing this, as it prevents their being lost.

This month we welcome another member of the Scholars' Club, who has joined the railways' team. He is Bill Williams, of 40 Florence Street, North Williamstown. Bill wants to become an advertising man, and is going to night-school to take a course in advertising art. We wish him the success he deserves.

Well, that is all the letters we have this month. We hope to have some more for you again next time. In the meantime, don't forget to ask Bill Smith, if there is anything you want to know about railways.

## World's Fastest Trains

### 82 M.P.H. FOR 268 MILES!

**I**T is only a little more than 100 years since the first railway locomotive was built. Its top speed was not more than ten miles an hour and many people thought that even that speed was dangerous. Since then engineers have learned so much that now we have many trains in the world that can be run at eight times the speed of the first railway locomotive with perfect safety.

One of the fastest trains in the world today is a German train called "The Flying Cologne" which runs from Berlin to the town of Hamm—a distance of 268 miles—at a speed of 82 miles an hour. This train is not a steam train. It is what is called a diesel-electric. Diesel-electric trains are run by oil motors which generate electricity, and then the electricity is fed to electric motors on the driving-axles of the train.

### Speedy American Diesel-Electric

Another fast train is the American "City of Denver," also a diesel-electric, which is owned by the Union Pacific Railroad Company. This train runs from Grand Island to Columbus—a distance of 62½ miles—at 81 miles an hour, and from North Platte to Kearney—a distance of 95 miles—at 80 miles an hour. The full length of the run, which the "City of Denver" makes, is 431 miles and it goes so fast with a twelve-car train that, although it stops five times on the way, its *average* speed for the whole distance is 76 miles an hour.

Germany has a very fast steam train also. It is the Berlin-Hamburg Express. This train runs a distance of 178 miles non-stop at a speed of 74 miles an hour. Another fast steam train is the American "Hiawatha" of the Chicago, Milwaukee, St. Paul and Pacific Company. This train covers a distance of 43 miles between New Lisbon and Portage at a speed of nearly 74 miles an hour from start to stop.

Other fast trains are the famous "Detroit Arrow" of the Pennsylvania Railroad Company, which runs between Englewood and Fort Wayne—a distance of 141 miles—at 73 miles an hour, and the English train "Coronation," which is owned by the London and North-Eastern Railway. This train runs from King's Cross to York at 72 miles an hour.

## Victoria's Railway History

### HOW SYSTEM COMMENCED

**I**N last month's Bulletin we told you about the first railway in Australia—the line which runs from Melbourne to Sandridge (Port Melbourne) and which was built in 1854. This month we are going to tell you a little more about the early days of railways in Victoria.

Three years after the Melbourne-Sandridge line was opened, the same company opened a branch line to St. Kilda. That was in 1857. In 1853, a second railway company had been formed in Melbourne. This was the Melbourne, Mount Alexander & Murray River Railway Company, which was formed to build lines from Melbourne to Williamstown and to the Murray River through the Mount Alexander district between Castlemaine and Bendigo. It was given much assistance by the Government, but in spite of that it made very little progress. In the end it sold out to the Government in 1856.

So the Victorian Government took it over and the construction, operation and care of the lines was made the job of the Commissioner of Public Works and the Surveyor General.

### Line from Geelong

About this time a third company was also formed. It was called the Geelong & Melbourne Railway Company and was backed by the Government. This company began to build a line from Geelong to Greenwich—near the Newport station. This line was opened on July 25, 1857.

Lines from Melbourne to Windsor and from Richmond to Hawthorn were built by the Melbourne & Suburban Railway Company at this time, and the last section was opened early in 1861. The following year, however, the Melbourne & Suburban Railway Company was sold by public auction and was bought by a company, which called itself the Melbourne Railway Company.

Three years later in 1865, this company joined the Hobson's Bay Company to form the Melbourne & Hobson's Bay United Railway Company, which now owned all the railways from Melbourne to Port Melbourne, to St. Kilda and Windsor and from Richmond to Hawthorn.

(TO BE CONTINUED)

## VICTORIAN RAILWAYS AIR-CONDITIONING RECORD

**D**ID you know that the Victorian Railways were the first in the British Empire to introduce air-conditioning on passenger trains? Yes, the first air-conditioned car in the Empire ran on the Melbourne-Albury service. Since then the railways have been building more and more air-conditioned cars. Altogether there are 20 air-conditioned cars in use at present, and more are being built.

There are five first class and four second class passenger cars, a dining and a parlor car, all air-conditioned and available for use on "Spirit of Progress," now running between Melbourne and Albury, while the Mildura service is now completely air-conditioned—including sleeping cars. In fact the Mildura train was the first train in Australia to include air-conditioned sleeping cars. On the Mildura line there are six trains a week each way and every train is com-

pletely air-conditioned.

Other air-conditioned cars in service are the dining car "Avoca," attached to the "Overland" between Melbourne and Adelaide, and an air-conditioned buffet car attached to the 12 noon train from Bendigo to Melbourne, and the 5.40 p.m. train Mondays to Fridays (6.20 p.m. on Saturdays) from Melbourne to Bendigo. Four more air-conditioned buffet cars are now being built at Newport.



# Electric Goods Locomotives Give Fine Service on Suburban Lines



**Y**OU have probably seen some of the big, black electric locomotives that haul goods trains on the suburban lines of the Victorian Railways. There are 12 of them altogether and they were all built by the Victorian Railways Department at its own workshops. The first one made its appearance on the tracks a little more than ten years ago.

These electric goods locomotives are used to haul suburban goods trains because they are more economical than steam locomotives for goods services. The reason for this is that electric locomotives are ready for service at any time, without the expense of keeping steam up, as

you have to do with steam locomotives, and because they are not burning up a lot of fuel while they are not working.

One of these electric goods locomotives can haul a load of 864 tons on a level track. Two of them coupled together can, of course, haul a much bigger load. These locomotives are fitted with the same sort of equipment as the motor coaches, which pull the suburban passenger trains, and they are built so that when two of them are coupled together one driver can control them both. Each locomotive has four electric motors—one motor to each driving-axle. In other words the locomotives are the 0-4-4-0 type.

## WHY AUSTRALIAN RAILWAY GAUGES DIFFER

**Y**OU will remember that in the Bulletin about two months ago we had a little story about railway gauges. The story told you what the gauge of a railway was and how some gauges are better than others. Now—as most of you probably know—nearly every State in Australia has a different gauge and this is how it happened. In 1846, the famous English statesman, William Ewart Gladstone, advised the Governor of New South Wales to use the 4 ft. 8½ in. gauge in building the New South Wales railways. He did this because the 4 ft. 8½ in. gauge was used in England.

Four years later, the engineer of the Sydney Railroad and Tramway Company suggested that the 5 ft. 3 in. gauge should be used and in 1852 this was authorised by a special Act of Parliament. At the same time, Victoria and South Australia also decided to use the 5 ft. 3 in. gauge.

Shortly afterwards, however, the Sydney company changed its engineer and a new Act of Parliament was passed, which provided that the 4 ft. 8½ in. gauge should be used. But by this time Victoria had ordered railway equipment for the 5 ft. 3 in. gauge and it was too late to change. So, New South Wales had a 4 ft. 8½ in. gauge, while both Victoria and South Australia had a 5 ft. 3 in. gauge.

But this was not all. Later on Queensland,

Western Australia and Tasmania chose a gauge of 3 ft. 6 in. because it was cheaper, and for the same reason South Australia altered the gauge on a part of its railway system. Instead of boarding a train at Brisbane and running right through to Perth, a passenger has to change from the 4 ft. 8½ in. gauge to the 5 ft. 3 in. gauge at Albury, from 5 ft. 3 in. back to 4 ft. 8½ in. at Port Pirie in South Australia and then to 3 ft. 6 in. at Kalgoorlie in Western Australia before he reaches his destination.

All these changes would have been unnecessary if all the States had only had sufficient foresight to agree on one gauge as the standard for the continent when they were building their first railways.

## YOUNG ROGER WILLIAMS IS IMPRESSED BY RAILWAYS GENERAL STOREHOUSE

"OH DEAR, I don't know what to do with this boy, I'm sure," said Mrs. Williams. "I've never known such an untidy person in my life before." "Hullo! This is news to me," said Uncle Tom, looking across the breakfast table at Roger, "You'll never make a good railwayman, if you're untidy, lad." Roger went rather red. You see he wanted to become a railwayman like his Uncle Tom, and from the look on his Uncle's face he knew that he had disappointed him.

"I'LL tell you what I'll do," said Uncle. "I'll take you along with me this morning and show you one of the biggest storerooms in the State, and if your mother has to complain about your untidiness after that, well, I'll know there's no hope for you. Is it a bargain?"

"Oh yes!" said Roger. "Is it a railway store?"

"It's the Victorian Railways General Storehouse," said his uncle. "We'll find it at Spotswood,  $5\frac{3}{4}$  miles by fast electric train from Melbourne. It's the place where they keep stores for every department in the railway system. Hurry up and eat your breakfast and we'll go right away."

Needless to say, Roger did not have to be told twice and in less than half an hour he and Uncle Tom were on their way to Spotswood. He was nearly bursting with impatience, when they finally reached the place.

"Now," said his uncle, "you can see that the Storehouse, which is that building just over there, is close to the Newport Workshops, the Spotswood Workshops and the Newport Power House." He pointed out the Workshops and Power House as he spoke. "The main Storehouse is therefore in the centre of the Department's principal engineering activities."

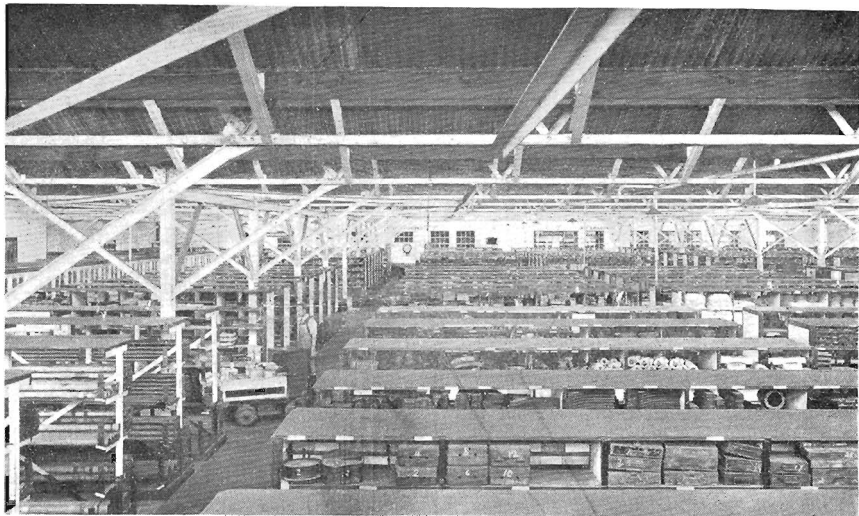
Uncle Tom led the way into the main store. "Now here," he said, "are the stores for every single section of the railways department—paint for the paint-shops . . . pencils, pens,

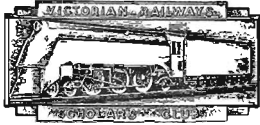
nibs, blotting paper and ink for the offices . . . in fact, there are about 15,000 different items here, each one in its allotted place."

"Now, the stock is grouped in sections according to the work it is required for. For instance, pens, pencils, nibs, ink and all those sort of things are grouped in the 'Stationery' section. And each item is given a special place in the section and a number. For instance, pencils may be kept in the 'Stationery' section on rack number 24, item number 11. Each section is in charge of a storeman, who is responsible for all the business in his section and nobody can come and take any goods out of his section without his permission."

"This storeman has to keep a list of the goods in his section, too, and he must be able to tell in an instant just how many packets or bundles or tins of any particular item he may have in stock."

"This sounds a pretty tall order doesn't it?" Roger nodded. His eyes were opened as wide as they could be. "And yet," continued Uncle Tom, "it's quite simple, because they use a system. We'll take the case of pencils again. Say that in the tray, which contains the pencils, there are 25 bundles and that each bundle contains 12 pencils. The storeman chalks the number of bundles on the front of the tray—25. Later in the day an order comes in and he takes one of the bundles out. He rubs out the 25 and writes in 24 in place of it. In this way he can tell at a glance how many are in the tray."





# SCHOLARS' CLUB BULLETIN

May, 1938

No. 10

## Scrap-Book Prize Winners

THE entries for the 3AW Chatterbox Corner Railways Scrap-book reached such a high standard that two extra prizes were awarded. The first prize of one guinea was awarded to Patricia Margaret Neville, 103 Lennox Street, Richmond. This scrap-book was well set up, had most interesting pictures and was really a wonderful effort.

Two other prizes, each of half-a-guinea have been awarded. One for the most original scrap-book was won by Aileen Carrick, 16 Pine Avenue, Camberwell. The other was awarded to the sender of the most complete scrap-book, Dorothy Pratt, 12 Grandview Street, Moonee Ponds.

A special prize of half-a-guinea was awarded also by "The Age" to Clem Meadmore, 42 Toorak Road, Camberwell, for a scrap-book containing almost every railway photograph that "The Age" has published lately.

Altogether every entry was excellent and it was a great pity that each one could not have received a prize.

## WHEN THE ROYAL TRAIN RUNS IN ENGLAND

WHENEVER the King and Queen travel by train a special time-table has to be made so that the Royal Train will not be delayed. This time-table is very carefully drawn up. When particulars have been received by the railway company stating the exact number of people who are to travel on the Royal Train, the "marshalling" of the train is decided upon. A diagram is made which shows what coaches are to be used and which is to be the front end of each coach. On this diagram the full length of the train is shown, together with the distance from the front of the train to the King's doorway.

By this means the railwaymen concerned learn just where the engine is to stop and where the red carpet is to be laid. When the diagram is finished, it is sent to Buckingham Palace for the King's approval.

### One Journey—£5000!

The King pays first class fares for every member of the Royal Party and an extra 13/4d. per mile for the use of the Royal Train. Queen Victoria once spent £5,000 on one train journey. This was because extra look-out men had to be stationed at every 200 yards along the line. Allowing for eight men to the mile—about 4,500 extra men had to be put on, which added considerably to the cost. Queen Victoria spent £10,000 a year on railway travel and would not travel at more than 40 miles an hour.

The Royal Train, used by the King and Queen on night journeys and on their annual visit to Balmoral Castle, belongs to the London, Midland and Scottish Railway. Although other railway companies in England have Royal Trains, too, this one is the best known.

## Transport Down The Ages



THE second of our series, this picture shows a scene during the Neolithic age—about 5,000 years ago. By that time people had discovered how to make sledges and to build dug-out canoes. These two discoveries enabled them to carry larger amounts of goods from place to place. Three or more men could help to haul the sledge, where before each man had to carry his goods on his back. Using the sledge enabled them to keep weapons near at hand to protect themselves from wild beasts. The invention of the dug-out canoe, which was hollowed out of a solid log, enabled them to build their villages either on islands or on long piles out in the middle of lakes where wild beasts could not attack them. Improvements in methods of transport—even at that time—played an important part in making living safer and more comfortable for everybody.

The vehicles are kept at Wolverton and number about 20. The two Royal saloons, which are furnished and decorated according to the wishes of the King and Queen, were originally built for the use of the late King Edward and Queen Alexandra, as Queen Victoria's saloon had become too old-fashioned.

The Royal Train is usually made up of ten vehicles. It is about 630 feet long and weighs about 370 tons. Next to the engine is a corridor brake coach with two first class compartments. The brake compartments are fitted with special lockers which contain tools and spare parts to replace any breakages that might occur during the journey.

The King always sits with his back to the engine and the Queen always sits facing the engine.

## DEAR MEMBERS—

**W**E have so many good things for you this month, that I'm afraid I shall have to make my little chat with you very short indeed. As you can see, we have continued our story about the history of the Victorian Railways and we have another one of the series of pictures about "Transport Down the Ages."

In addition to these we have a very interesting story about the preparation of food in the railways and an unusual one about railway tickets.

I mustn't forget to mention the wonderful entries which were sent in to the 3AW Chatterbox Corner Railways' Scrap-book Competition. I was really delighted by the number of them, and the skill shown in arranging the cuttings in some of the books was also very fine.

Well, I'm afraid I cannot take up any more space as it is very valuable this month, so I shall just say goodbye until next month.

Your Pen Pal . . .

*Bill Smith*

## V.R. DINING CAR DEPOT'S VARIED ACTIVITIES

**D**O you know that the railways possess a Dining Car Depot at West Melbourne, which supplies meat to every railway refreshment room in Victoria? This wonderful place also supplies the food for the dining and buffet cars.

The railways have special buyers, who go to the meat and fruit markets and buy all the supplies of meat, fruit and vegetables. At the Dining Car Depot there is a huge butcher's shop, which contains special vats for making corned-beef and for pickling pork.

There are also big meat-mincers and a sausage-making machine. Here the meat is cut up into joints and chops as it comes in from the market and is placed in big freezing chambers, where it is kept fresh.

There are big storerooms here, too, which are filled with groceries—and with all glassware and crockery for the dining cars. There are huge boxes of fresh eggs, too, which come in each day from the Railways' own poultry farm.

### Meat Pies, Ice Cream . . .

There is a big bakery at the Dining Car Depot, where all the meat pies and raisin bread are made for the station refreshment rooms and the buffet cars. They make fruit pies here, too, and 14-lb. blocks of fruit cake.

They have an ice cream making plant, which supplies all the ice cream for the dining and buffet cars. In a great big kitchen all the food is cooked for the dining cars—soups, roasts, vegetables and sweets all cooked here first and kept hot on the train until required.

There is a wonderful laundry at the Dining Car Depot, too, where all the table-cloths, serviettes, sheets and pillow-slips from the trains are washed and ironed before being used again. All the washing and ironing is done by machinery and the

## Letters to Bill Smith

**H**ERE are some more brief replies to the many interesting letters, which Bill Smith is receiving from Members of the Scholars' Club each month. As you all know Bill writes to every member who sends him a letter, but each month we pick out a few, which we think will interest you all and answer them in the Bulletin.

Our first letter is from George Miller, of Spring Vale, who wanted to know, who was the first driver to try out the Westinghouse air-brake in Victoria. Bill Smith tells us that an expert of the Westinghouse Brake Company, Mr. Selley, was sent from England when Westinghouse brakes were being introduced here. Mr. Selley arrived in Victoria early in 1884. As he was a qualified engine driver, he drove the first engine that was fitted with the brakes and taught our drivers how to use them.

### "Boosters" Explained

Alan White, of Pascoe Vale, wanted Bill to explain an unusual roaring noise which he has heard the X33 engine making. Bill says that most of our big engines have a "booster," which is really a small engine inside the main engine and which is used to generate extra power to help pull a heavy load over a hill.

The noise, which Alan heard, is caused by the the steam being turned into the "booster" cylinders to warm them up before the X33 takes the steep grade just out of Pascoe Vale and is made by the gears revolving in the "booster" cylinders.

A very interesting letter came from Ian McMaster, of Rosanna. Ian asked Bill, if the Victorian Railways had built any turbomotives. We have not built any steam turbomotives, but we are carefully noting the performances of a steam turbomotive number 6202, which was built in 1935 for the London, Midland and Scottish Railway. We have found the steam locomotive to be efficient and although we know that it is not perfect, we do not think that the turbomotive has yet proved itself.

Bill was also glad to hear from Bob Rogers, of Camberwell, whose father helped to build "Spirit of Progress."

Bill has received a nice little letter from Audrey Green, 3 Tranmere Avenue, Murrumbidgee, who wants to correspond with a pen friend interested in stamp collecting.

things are boiled to make sure that they are quite clean and fresh.

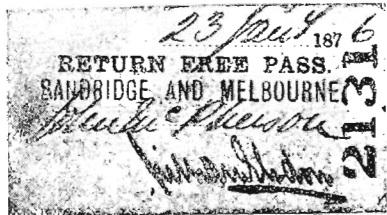
All the mattresses from the sleeping cars and all the pillows have special covers, which are washed every time the cars come into the shelter shed at the Depot, and the mattresses and pillows are all fumigated. Sheets, pillows and serviettes which have been torn are sent to the "linen" room, where they are mended.

Just to give you some idea of the enormous amount of work, which is done by the 112 people, who work at the Dining Car Depot, here is a list of some of the things cooked in the bakery last year. They baked 320,000 loaves of raisin bread, 47,300 dozen pies, 16,200 dozen scones, 20,800 lb. of fruit cake and 12,400 dozen yeast buns. In the butcher's shop they used 600,000 lb. of meat—that is five tons of meat every week—and they made enough sausages to stretch a distance of 35 miles!

From this you can see why it is that the Dining Car Depot is a very important place, and you will understand why it is that the bakery, butcher's shop, laundry and kitchen are all kept going so busily.

# The Romantic Story of Railway Tickets

**I**N our articles about the history of the Victorian Railways we read that the first railway line in Australia ran from Melbourne to Sandridge, which was the old name for Port Melbourne. Here we have a picture of one of the tickets which was used on that line. It is a free pass, which was issued on January 23, 1867. This pass was issued to John McPherson, one of the first employes of the Hobson's Bay Railway Company, who later transferred to the Victorian Railways.



The ticket is not very different from the tickets which we use today. It is made of cardboard and has a number stamped on it. In the early days of railways there were no cardboard tickets as we know them now. Tickets, made of paper and with the passenger's name written on them, were issued in *threes*. One was kept by the booking clerk, one was given to the passenger, and the other to the guard.

This arrangement was too clumsy and later on the railway companies began to issue *metal* checks.

It was not until 1836—just over 100 years ago—that a man named Thomas Edmondson invented the cardboard railway ticket that we know today. Since then the Edmondson system has been adopted by railways all over the world.

Thomas Edmondson also invented a special machine for storing tickets. This machine was built in such a way that when a ticket was taken out of the slot another was moved into its place automatically. Another of his inventions was an automatic machine for printing the date on tickets. He died in 1851, but today the firm which he founded is one of the leading suppliers of machines for ticket printing, dating and issuing.

## Overseas Rail Tickets

Although many countries have tickets which measure the same as ours, there are a number of other shapes and sizes throughout the railway world. Some of the European lines have tickets which measure  $1\frac{1}{2}$  inches by  $\frac{3}{8}$  inches long. Ours measure  $2\frac{1}{8}$  inches long and  $1\frac{1}{16}$  of an inch wide.

In Lithuania railway tickets are nearly five inches in length, while in Malta tickets measuring one square inch are common. Circular tickets are available on railways in British North Borneo, and in Japan return tickets are often made just double the size of singles.

On the Persian State Railway, which is only 6 miles long, the tickets are among the largest in the world. They measure 8 inches by 4 inches. The longest tickets are issued in the United States of America, where strips of tickets measuring as much as 15 inches in length are used for certain journeys.

In some countries tickets are printed in two or three different languages. For instance, in Palestine tickets are printed in English, Arabic and Hebrew, while some Swiss tickets are printed in French, German and Italian.

Tickets on the Nizam's State Railway in India include morning meals for soldiers.

All of these tickets are for railway travel, but our own Victorian Railways issue tickets for travel by every means of modern transport including sea and air. If ever you go to Mt. Feathertop for a holiday, you will be issued with a ticket which includes travel on horseback. One of the most original tickets in the world is issued for special tours to Alice Springs and includes travel on a camel.

In Victoria, more than 44 million ordinary country and suburban tickets are issued annually. If these were placed on end they would reach from Melbourne to Rockhampton—a distance of 1,600 miles.

## Brief Historical Review of Victoria's Railways

**Y**OU will remember that in our story last month about the history of the Victorian Railways, it was told how the Melbourne and Hobson's Bay United Railway Company controlled all the railway lines that had not been taken over by the Government. Well, in 1859 a line was built from St. Kilda to Windsor by the St. Kilda and Brighton Railway Company. It was extended to Brighton Beach in 1861.

In those days it looked as though Brighton Beach was going to be an important port. This company was bought out by the Melbourne and Hobson's Bay United Railway Company in 1865.

In 1860, the Melbourne and Essendon Railway Company built a line between Essendon and a point about  $1\frac{1}{2}$  miles from Spencer Street. This company was taken over by the Government in 1867. Meanwhile, the Melbourne and Hobson's Bay United Company had been running regular services over 16 miles of lines, but on July 1, 1878 it, too, was taken over by the Government.

## Government Takes Over

The reason why the Government took complete control of all the railways was that it could keep up the services, which the companies were unable to continue, also because the companies built lines to compete with each other, which was a waste of money and meant higher fares for passengers.

From that time on, railway construction work was pushed forward rapidly and new lines were built from Melbourne through all districts and parts of the State. When the Government took over the Hobson's Bay Company's lines in 1878 there were only 967 miles of railway in Victoria. By 1891, 2,800 miles of railway were carrying traffic.

## Nearly 5,000 Miles of Track

At the present time, the Victorian Railways comprise more than 4,700 miles of tracks, and the lines are so located that very little of the State, except in the mountainous regions, is more than eight miles from a railway.

(CONCLUDED.)

## Buying "Save To Travel" Stamps Is Easy Way To a Great Holiday

"HELLO, Len! Where are you going?" Len Thompson turned around. Running towards him was a red-headed boy with bright blue eyes. It was his schoolmate, Tom Ryan.

"Hello, Tom!" said Len, "I'm going down to Barret's to get some stamps. Dad gave me two shillings for cutting the hedge and mowing the lawn this morning and Barret's have got some new sets. Coming?"

"All right," said Tom!

"Golly," said Len, "You don't sound very interested. I always thought you were pretty keen on stamps. You had the best collection in the school last year, but I haven't heard you say a word about them since we came back from the Christmas holidays. Don't you collect now?"

"Oh yes, I still collect," said Tom, "I've got a better collection now than I ever had before, but they're a different kind."

"How do you mean, a different kind?" asked Len, "Stamps are stamps, aren't they?"

"Mine are all of one kind," said Tom, "and I'd rather have them than any others."

"I wish you'd tell me what they are, then," said Len. He was getting a little bit impatient. "There's no need to be so mysterious about them."

"Very well," answered Tom, "they're SAVE TO TRAVEL STAMPS!"

"I've never heard of them before. What do you use them for? And where do you get them?"

"You can buy them at the Victorian Government Tourist Bureau, and at all railway stations and post offices," replied Tom. "It's a new way of saving to travel. You buy SAVE TO TRAVEL STAMPS and stick them in a special book and when you have enough of them you can exchange them for tickets."

"That sounds good to me," said Len.

"Yes," said Tom, "you can travel by rail, road, sea or air."

"Just think of it," said Len. "You could save up and go a trip by train or by the road—or even on a steamer or in an aeroplane. How much do the stamps cost?"

"You can buy them for a shilling or five shillings each," said Tom, "I've got nearly a pound's worth in my collection already."

"That's what I call *real* stamp collecting," said Len, "that's worth while. You get something back for the money you spend. Gee! What bonzer trips you could have. Come on! Let's go down to the post office now. I'm going to start one of those collections—now."

"That's the idea, Len," said Tom, "let's both go together. We'll SAVE AND TRAVEL with SAVE TO TRAVEL STAMPS!"

## FAMOUS RAILWAY VIADUCTS OVERSEAS AND IN VICTORIA

A VIADUCT may be described as a bridge formed of a number of smaller bridges placed end to end. Viaducts are built in different ways. They may consist of a series of stone, brick or concrete arches; they may be of timber; or again they may be made of iron or steel girders supported on piers constructed of various materials. These piers are sometimes of brick, stone or concrete and sometimes of iron or steel in the form of high trestles.

A viaduct of iron or steel girders supported on iron or steel trestles is spoken of as a trestle viaduct. The girders are usually made in one of two forms—plate girders or lattice girders.

Steel trestle viaducts with lattice girders have been adopted very extensively in North America and have been built there of considerable size.

### Viaduct 97 Years Old

There are a great number of wonderful viaducts in England, although England is not a very hilly country. One of the most important of them is across the river Ouse near Haywards' Heath in Sussex. It was built in 1841, and has 37 arches each with a span of 30 feet. The total length of this viaduct is 1,475 feet and at the highest point the rails are 96 feet above the ground.

America contains two of the most unusual pieces of railway viaduct construction in the world. One of these is the Lucin Cut-off,

which is 27½ miles long and carries the famous Union Pacific Railway Line across the Great Salt Lake in Utah.

But the outstanding piece of viaduct construction is the famous Key West Extensions of the Florida East Coast Railway which runs across the Gulf of Mexico for 114 miles from island to island and connects the city of Miami with the island of Key West. One of the viaduct bridges on this 114-mile stretch is seven miles long.

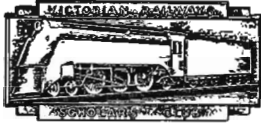
### Victoria's Longest

There are a number of viaducts of various types in Victoria. The longest is of timber construction over the Mitta River at Tallangatta, and is 4,660 feet long consisting of 20-foot spans.

Another notable viaduct was over the Moorabool River near Geelong. This originally consisted of ten spans of 130 feet made of iron lattice girders supported on stone piers about 90 feet high. To strengthen it to carry the modern heavy locomotives it was found necessary to build additional steel trestles in the centre of each opening and replace the lattice girders with plate girders of shorter span.

The most important viaduct in Victoria is that between Flinders Street and Spencer Street stations. It is approximately half-mile long and is constructed of steel girders supported on brick piers. This viaduct carries four separate railway lines.





# SCHOLARS' CLUB BULLETIN

June, 1938

No. 11

## All About Rails

### 110 lb. HEAVIEST HERE

**W**HAT is a 100-lb. rail? Well, all rails are known by their weight per yard. So a 100-lb. rail is a rail that weighs 100-lb. for every yard of its length. There are three parts to a rail. They are—the head, the web and the base or flange.

The weight of rails varies according to the weight of the traffic they are to carry. On the light country lines in Victoria, where the trains are hauled by light engines and the traffic is not very heavy, 60-lb. rails are used. On the more important main lines rails weighing up to 90-lb. and 100-lb. are needed to carry the increased loading and heavier locomotives.

The heaviest rails in use in Victoria are to be found right in the city area. They weigh 110-lb. and are used on the suburban lines. The reason for this is the heavy volume of traffic which passes over them day and night. In addition to the constant stream of electric passenger trains all day and up to 12 o'clock at night, there are a certain number of passenger and heavy goods trains from the country, so you can see that a heavy rail is needed to carry such a lot of traffic.

The sleepers play a large part, of course, in helping to carry the weight of the traffic on a line and the spacing of sleepers is very important. The heavier the traffic on a line the closer together the sleepers are placed. The ballast is also an important factor especially on lines where high speeds are necessary.

Although 110-lb. is the heaviest weight of any rail used in Victoria, much heavier rails are used in America. In that country, there are large numbers of very heavy freight trains and rails as heavy as 130-lb. are to be found in use, while the American Railway Engineering Association has drawn up plans for rails weighing as much as 150-lb. to the yard.

### “TIE” STATIONS' VALUE

**H**AVE you ever heard of a “tie” station? No! Well, “tie” stations play a very important part in the Victorian Railways' scheme for keeping all the electric trains on time. “Tie” stations contain special equipment which prevents damage by lightning and other causes to the overhead gear on all our electrified railway lines.

For instance, when lightning strikes the overhead wires it may travel along them for some distance and be the cause of much damage unless prevented. The “tie” stations automatically cut out the section of overhead wires affecting the lightning, and thus prevent the damage from spreading.

## GREAT NEWS!

### Tours Again Soon

**I**T will interest members of the Scholars' Club to learn that the Scholars' Tours of various sections of the Railway Department will be started again at a very early date. We have had so many letters and enquiries from members asking when the tours would be starting again that we are doing everything we can to arrange the first of the new tours as early as possible. So be sure to look out for the date.



**H**ERE is the third of our series of pictures showing Transport Through the Ages. Last month you will remember, we showed how men learned to build sledges, which they hauled themselves and thus were able to move heavier loads than were possible when they had to carry all their goods on their own shoulders. This picture shows the next step . . . the taming of animals, which could be trained to carry goods. This is rather unusual as it shows YAKS in a mountain pass in Thibet. You can see from it that in mountains such as those, yaks are still the most efficient form of transport, as nothing but an animal that lives among them could carry goods over those rough, steep slopes.

## AMAZING RAILWAY SIGNALLING SYSTEM

IN previous issues of the Bulletin we have learned a lot about signals—how many different kinds there are and what they are used for. This time we are going to see how they are worked. Let us visit the Flinders Street "A" Signal-box. Here are 279 levers. Four men work these levers in busy times and two men in slack times. These men have to know exactly what each one of those 279 levers does.

Not all of these levers work signals. Some of them work points, some lock bars and some signals. And they must always be worked in the proper order: first the point, then the lock bar, and last the signal lever. Let us pretend that a train is travelling from Spencer Street station to Flinders Street station along North Viaduct route to No. 8 Road.

The signalman operates two point levers, five lock bar levers and two signal levers. Some lines have even more points and signals than that. When you stop and think of the number of trains that come and go at Flinders Street, you can see that the signalmen in "A" Box have a very busy time.

Even more wonderful is "D" Signal-box at Flinders Street. In this signal-box everything is worked by electricity and the signal levers are only five inches long and can be moved with one finger. In front of the signalman there is a wonderful diagram, which is lit up and which shows where all the signals and points in the yard are.

At the same time it shows the progress of the train over the different parts of the line by means of a strip of shadow. The platform road is black when the train is at a station, and when the train is passing over a set of points the

shadow on the diagram shows the signalman that the points are fouled and cannot be operated.

Every 24 hours 2176 trains pass in and out of Flinders Street carrying thousands of passengers. In addition numerous goods trains, pilots and specials are handled. In one hour the greatest number of trains in and out of the station is approximately 240, and this is believed to be a world's record for any one station. Think of it . . . 240 trains in 60 minutes. That is four trains every minute!

You might think that it would be very easy for them to make a mistake with the points, and signal a train onto the wrong line. But the apparatus has been arranged so that it is impossible for them to operate the signal for any line, unless the proper points have been set. This is just another of the very many ways in which the Railways make sure that all passengers travel in safety.

The locking system between signal-boxes at Flinders Street is another way in which accidents are prevented. The way it works is this.—When the signalman at one end of the station is signalling a train into any road, the locking system prevents the man in the signal-box at the other end of the station from letting a train enter the same road at that end.

This means that there is never any danger of a collision. The different kinds of levers are all painted different colours. The colours are black for point levers, red for signal levers and blue for locking levers.

Inside the signal-box red and green lights indicate to the signalman what position the signal is in. When points are operated a letter lights up showing that the set of points has fully responded.

## More Letters for Bill Smith

**B**ILL SMITH has had a very fine lot of letters from members this month and he has passed a few of them on to us, as he thinks they will interest other members, too.

The first letter is from Robert Johnson, Glencairn Avenue, Coburg, who wanted to know the maximum number of tons that each of the following engines could haul on level ground:—an "X" Class, an "S" Class, an "A2" Class and a "D3" Class. Bill Smith says that the loads these engines can haul are based on the time-table to which they have to run.

For instance, an "S" Class engine hauls a passenger train, which weighs 500 tons at a speed of up to 70 miles per hour; while an "X" Class locomotive has hauled a wheat train of 1600 tons, but at a much lower speed. The tonnage for a normal schedule of an "A2" and "D3" engine is 1,065 tons and 880 tons respectively.

Our second letter is from Noel Hart, Carlisle Crescent, Oakleigh, who wanted to know if the driver of a train has to guide it, what makes trains wobble, and what the hinged disc on a train is for. Bill Smith tells us that a train does not have to be steered like a motor car as its wheels are flanged so that they cannot leave the rails. The wobble only takes place at a

fairly high-speed and is caused by the flanged wheels running against the rail and being straightened up by the springs.

The open white disc on the rear of the train tells the signalman that the complete train has gone past him and an open red disc on the rear tells him that only one section of the train has gone past and that he must expect another to complete the train. When the train is coming towards him the disc is folded down. We told members something about these discs in the January issue of the Bulletin.

Another interesting letter came from Doug. Supple, Park Street, Elsternwick. Doug. was on his way to Ballarat and wanted to know what was the strange object he saw being handed to the porter of each station he passed through by the driver of the train in which he was travelling. Bill Smith says that the object is called the "staff" and is very important, as without it the driver cannot move his train.

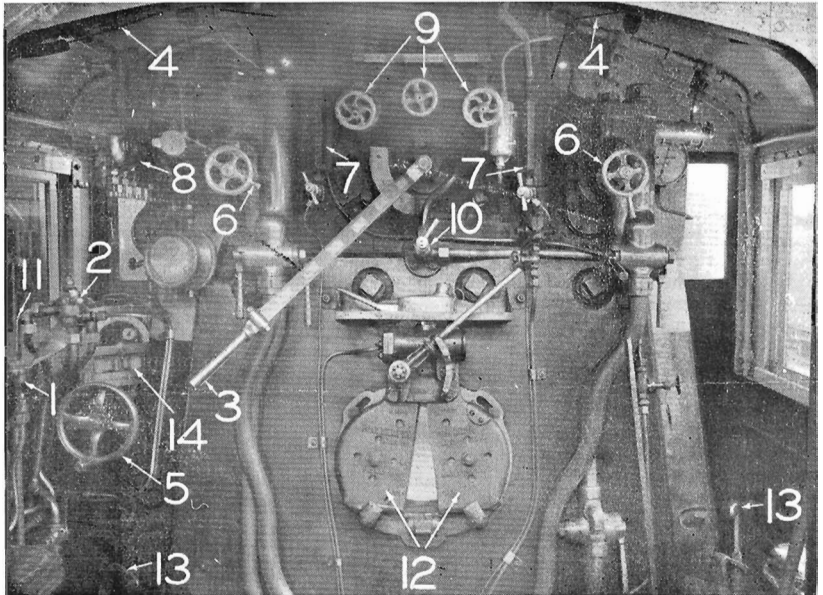
The idea is that on most country lines, Ballarat included, there is only one set of rails. So, whenever a train leaves a station to travel over a section where there is only a single track, the driver is handed the "staff" for that section. This means that as there is only one "staff" to each section, the driver who has the "staff" is the only driver who is entitled to travel over that section.

If he cannot be given the "staff," it means that there is another train on the section and he has to wait until the other train comes through. When the driver comes to the end of the section to which he holds the staff, he returns it to the station at that end of the section.

# This Will Be Of Interest To All!

Here is a photograph of the driving cabin of an "S" class locomotive. The engine which hauls "Spirit of Progress" is one of the "S" class engines, and here you can see all the gadgets which help the driver to control the train. We have marked them with numbers in the picture so that you can pick them out easily.

(Bartley Drohan, Dalmore Avenue, Ormond, suggested that we describe the locomotive's controls.)



1. **THE DRIVER'S BRAKE VALVE.**—By means of this valve the driver operates the brakes on the train.

2. **THE DRIVER'S STRAIGHT AIR-BRAKE VALVE.**—This enables the driver to apply the brakes on the engine and tender only.

3. **THE REGULATOR HANDLE.**—This operates the valve which when opened allows steam to pass from the boiler to the engine.

4. **THE WHISTLE CONTROL.**—This is used to operate the whistle.

5. **REVERSING GEAR.**—This controls the movements of the locomotive either forwards or backwards.

6. **THE INJECTORS.**—As you can see there are two of these—one on each side of the boiler—and we have marked them both with the figure "6." They supply water to the boiler.

7. **GAUGE GLASS MOUNTINGS.**—There are two of these and they are placed one on each side of the boiler. They show the driver the amount of water in the boiler.

8. **THE LUBRICATOR.**—This supplies oil to the valves and pistons and to the air-compressor for the Westinghouse air brake.

9. **STEAM VALVES.**—These control the supply of steam to work the generator, lubricator, air-compressor, injectors, and blower. You can see them quite plainly on the picture. They are those little wheels on top of the fire-box.

10. **THE BLOWER.**—This is a steam valve. When the regulator is closed or the engine is standing still, the blower valve is opened to let a small jet of steam pass up the funnel. This jet of steam creates a draught in the funnel which carries away smoke, etc.

11. **THE AIR-SANDERS.**—The lever numbered 11 controls the air-sanders. When the lever is operated it permits a supply of sand to

be dropped on the rails in order to prevent the wheels from slipping.

12. **FIRE-BOX DOOR.**—The door is opened by the fireman placing his foot on a treadle on the floor. It is used when the engine-man wants to open the doors to put coal on the fire or for any other purpose. You can see how handy it is, when he has a shovel full of coal in his hands and wants to open the door. In the event of a failure of the treadle-gear, the door can be opened by the hand lever.

13. **DAMPER LEVERS.**—These operate the dampers, which regulate the quantity of air passing through the fire from underneath.

14. **THE SPEED RECORDER.**—You will remember that we had a special article about the speed recorder in the March issue of the "Bulletin." It shows the speed of the train and the time taken by it to cover every part of its run. This is done by means of a graph, which is drawn on a special chart in the speed recorder.

## DEAR MEMBERS—

**W**ELL, once again we have a splendid issue of the Bulletin for you. It is packed with interesting articles, and contains also some good news about Scholars' Tours.

I am particularly pleased with the numerous letters which I am receiving from members of the Scholars' Club. I am getting more and more each month and they all contain interesting questions which show that you members are every bit as keen about railways and engines as I am.

Your Pen Pal,

*Bill Smith*

## Look For Pantographs On Electric Trains

**W**HAT is a pantograph? I thought that would puzzle you. The correct name for it is pantograph-collector, though it is referred to by railwaymen as the "panto." It is that funny looking thing, which you can see on top of the motor-carriages of electric trains. As you will notice it connects with the overhead wire and collects the electric current to drive the motors of the train. Now there are a lot of unusual and interesting things about pantographs, which are not known by people who do not work in the railways.

First of all: Did you know that the pantograph is held up against the overhead wires by compressed air and that, if the air is shut off, the pantograph is pulled down flat on the roof of the train by four powerful springs? One reason for this is that if any damage happened to the overhead wires and part of them hung down the pantograph might catch in the broken parts and pull a lot more down.

So, if the driver of the train sees anything like that, he just opens a little air valve and lets the air that is holding the pantograph escape. Then the springs pull it down on to the roof and it clears the damaged part of the overhead wires.

Another reason is that, if anything went wrong with the Westinghouse Air-brakes on the train and there was no air to put the brakes on, there would not be any air to hold the pantograph up. So down it would come. And then there would be no electric current to drive the motors. Consequently the train would stop. Now you see that the compressed air idea is a very safe one.

### Make-Up of Trains

If you look closely at any suburban train, you will see that it is made up like this:—First there is a motor carriage, then a trailer without a pantograph or motors, then another motor carriage, then another trailer, and so on. Each motor carriage and trailer is called a "unit" and the driver in the front of the train can control the pantographs and motors in all the other units. This means that electric trains are really more powerful than steam-trains, because all the driving force in a steam train comes from the driving wheels of the locomotive, whereas in an electric train there are driving wheels on every motor carriage.

The electrical "pressure" in the overhead wires is 1500 volts. That is the voltage of the motors on an electric train, but for the lights there is a special machine which halves the voltage. In other words the voltage in the lights is only 750 volts.

When the train is put into the shed or run on to a siding at night, the pantograph is pulled down, but there is a special tank, which is filled with compressed air so that the driver can raise the pantograph the next day. If he can raise the pantograph on one unit of the train, he can start the air-compressor in each of the other units.

The overhead wires against which the pantograph rubs and the upper surface of the pantograph itself are made of copper, as copper is the best conductor of electricity and does not rust away like other metals. The overhead wire is always kept well greased so that the pantograph will slide along it smoothly. This greasing stops the wire from wearing out too quickly.

The adjustment of the overhead wire has to be done very carefully so that the pantograph will always make a good contact with it.

For instance, the wire is usually eighteen feet above the tracks, but when the line goes under a bridge the wire has to be lowered and then raised again on the other side. If it were raised too suddenly the compressed air in the train would not be able to push the pantograph up fast enough to keep it in contact with the wire, thus cutting off the power and stopping the train. So the wire has to be raised slowly on a long slant.

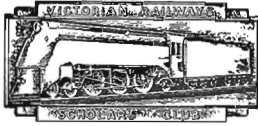
You may have noticed that the rubbing surface of the pantograph is fairly wide, while the overhead wires are very thin. Although you cannot notice it, the wire is zig-zagged across the track by means of supporting arms so that it will move from side to side of the pantograph as the train is in motion. This is a good idea as it prevents the wire from wearing a groove in the centre of the pantograph.

You must understand that the pantograph must always make good contact with the overhead wires. Otherwise there would be electrical sparking between the rubbing surface of the pantograph and the wire not only burning the wire but causing crackling in radio sets. The pantograph is really a very important piece of machinery and great care must be taken to see that it is always working properly.



In the Gravitation Yard Signal Box, North Melbourne. Transmitted through the microphone to the powerful amplifiers outside, the signalman's voice can be heard by shutters many hundreds of yards away. A great help to them!

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# SCHOLARS' CLUB BULLETIN

July, 1938

No. 12

## Scholars' Tours Have Started Again !

### DEAR MEMBERS—

*If my letter seems shorter this month it is only because we are cramming so many interesting articles about railways into each issue of the Bulletin that there just isn't any room for me to put in a really long letter.*

*I am glad to say that the membership of our Scholars' Club is still growing steadily and that I am receiving more letters from members each month.*

*Don't forget to watch the pages of the Bulletin for further announcements about the new series of tours, which have been started again.*

*Your Pen Pal,*

*Bill Smith*

### Transport Through The Ages

HERE is the fourth of our series of pictures showing Transport Through the Ages. The picture shows a huge statue of solid stone being hauled along the banks of the river Nile by human slaves. All work of this kind was done by man power in Ancient Egypt, although the Egyptians had trained the ox to pull ploughs and the ass to carry goods on its back. In the background are three ships of the type that was used by the Egyptians for carrying goods and people up and down the Nile and along the shores of the Mediterranean. These ships, however, were not sufficiently seaworthy to make long voyages, though they were certainly a great improvement on the dug-out canoes, which were used by primitive men.



### CHEAP RAILWAY FARES

"IT'S the best news we've had for many months" said one member gleefully when he read in last month's Bulletin that the Scholars' Tours of railway activities were to be resumed. Actually, the tours have already started.

Here is a list of the places to which tours will be arranged :—

Newport Workshops ; Spotswood General Storehouse ; Reclamation Depot ; Flash-Butt Welding Depot ; Spotswood Workshops ; Newport Power Station ; North Melbourne Locomotive Depot ; Shelter Shed and Dining Car Depot ; Spencer Street Testing Laboratory ; Jolimont Workshops and Sub-station ; Melbourne Goods Sheds ; Printing Works ; Powers Machine Division ; Train Control Office ; Telegraph Office ; and Automatic Telephone Exchange.

There are very big reductions in the rail fares for travel from your home station to the station nearest the point of inspection. For instance, the ordinary half-fare from Caulfield to North Williamstown is 11½d. second-class return. But when travelling on one of the tours, the fare is only 7½d.

About three hours are spent at each point of inspection. Parties are limited to 48 children ; on arrival at their destination, the party is divided into groups of 12. That's a good idea, because the smaller groups enable everyone to hear the interesting things said by the railwayman in charge.

These tours, as you all know, are wonderfully interesting, and you should not only book for more trips yourselves, but you should tell all your school pals about them. Remember : once a scholar makes a tour, he or she is eligible to join the Scholars' Club, receive a badge and then, each month, the Scholars' Bulletin.

**ASK YOUR TEACHER ABOUT THE TOURS !**

### Controlling Electric Power

YOU will remember how, in a recent issue of the Bulletin, we told you about "Tie Stations" and how they prevent damage to great lengths of overhead electric wires by automatically cutting out the damaged section before the trouble can spread. These tie stations work automatically. In order that the controlling engineer in charge of power may have them all under his supervision, however, a big "nerve centre" is being built in Batman Avenue near the Flinders Street Station.

In this "nerve centre" large diagrams will show the positions of the various tie and sub-station circuit breakers by means of lights, so that the controlling engineer can tell at a glance, if a tie station has cut out a section of the overhead wire. The controlling engineer will also have a desk with keys which will enable him to control the various stations represented on the diagrams.

# Across Australia By Rail In Three Days

## First Aid Is Important In Victorian Railways

**D**O you know that the Victorian Railways Department has its own Ambulance Organisation? To maintain this Organisation to the desired standard of efficiency, classes enabling employes to become qualified in First Aid are held during the year throughout the State. This is just another way in which this Department carries out its motto of "Safety First."

Spread throughout the Service there are large numbers of qualified employes who are able to render assistance to any member of the travelling public, who may become suddenly ill. In addition, groups of men are trained in the advanced work, so that in event of accident they are able to render such assistance as is necessary until the arrival of a doctor.

When you think of the size of the railway yards, workshops, and the number of trains that are running, you can appreciate that no matter how carefully the job is done, minor accidents are bound to happen. However, when they do, the aim of the Department is to have some one on the spot who knows what to do.

Each year more and more railway men are learning First Aid, because they realise just how important First Aid really is in cases where the services of a doctor cannot be procured immediately.

## Bill Smith Still Getting Letters From Members

**O**NCE again we have chosen a few of the many letters, which members have written to Bill Smith during the past month and which we think will interest you all. We are printing them together with Bill's answers.

Martin Kelly, of Park Street, Elsternwick, wanted to know about the air-pipes which run from one truck or carriage to another. Bill says that the pipes Martin saw carry air for the air-brakes from one end of the train to the other. Underneath each truck or carriage is a 1 inch mild steel pipe with flexible ends that can be hooked on to any other truck or carriage. The air that is in the pipe is pumped from the engine and is restored by pumping more every time any of the air is used. You will find this explained more fully in the articles on the famous Westinghouse Air Brakes, the first section of which is printed elsewhere in this issue.

George Bristow, of Shenfield Avenue, Chelsea, wanted to know why a quarter moon shaped piece had been taken out of the top inside portion of the buffers on the tender of an engine he saw. Bill says that the pieces are taken out so that the frame of the canvas covered passage-way that joins country cars together can fit snugly between the buffers without fouling the coupler that joins the carriages.

Bill had another very interesting letter from Philip Jones, of Black Street, Middle Brighton. Philip has sent along a copy of a magazine containing some very interesting photographs and an article about a splendid model railway which is laid out in his backyard. We have written a special article about it in this issue.

## NEW, FAST TIME-TABLE

**C**AN you imagine travelling from one side of Australia to the other in less than three days! Well, that is what all train travellers from Melbourne to Perth are doing now. Since the railways speeded up the service last month, actually only two normal business days are spent in covering the 2,100 miles between the two cities. Sleeping car passengers now travel direct from Melbourne to Port Pirie (South Australia) without changing trains at Adelaide.

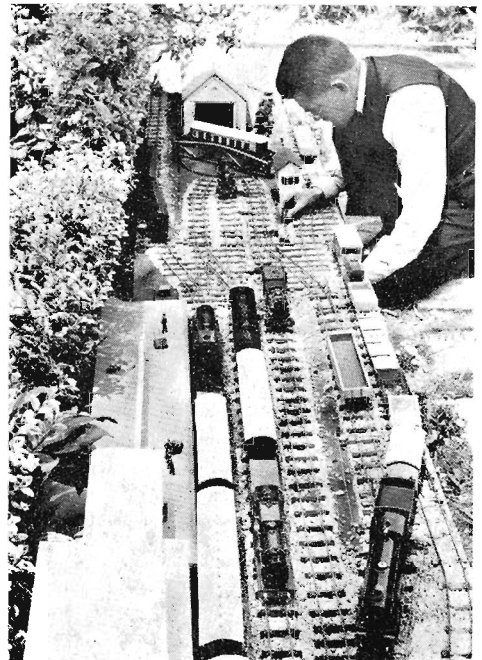
Each train between Port Pirie Junction (South Australia) and Kalgoorlie (Western Australia) includes an air-conditioned lounge car and an air-conditioned dining car. Everything has been arranged so that passengers can relax and travel in comfort. Comfortably upholstered and roomy passenger cars are a feature of the service, and the sleeping cars have wide berths, reading lamps, wash basins, clothes lockers . . . in fact, they are really comfortable bedrooms on wheels.

In addition to these, there are special observation cars with wide windows and big comfortable chairs so that passengers can sit at ease as the train rushes along. Another big feature is the air-conditioned dining car in which you can get all sorts of refreshments and all your favourite dishes.

This faster service to Western Australia is only one instance of a big improvement in Victorian Railways passenger train services generally which commenced in 1934 and has already reduced the travelling times of trains in Victoria by 693 hours per week.

## MODEL RAILWAY

(See Opposite Page For Story)





# WHERE RAILWAY SLEEPERS COME FROM

## Average Life Up To 30 Years !

**H**AVE you ever wondered where railway sleepers come from? I don't mean sleeping cars but the wooden sleepers to which the rails are spiked. These sleepers are very important and must give long service. They are cut to measurements and vary slightly in length according to the gauge of the line which they are to carry. The smallest sleepers in use in Victoria are five feet six inches in length, while the largest are nine feet in length. There are two types of sleepers. They are the rectangular sleeper and the round-top sleeper.

Seven kinds of timber are used for sleepers. There are five superior kinds and two inferior kinds. The superior kinds are grey box, red ironbark, red gum, red box and yellow box. And the inferior kinds are mahogany and yellow stringy-bark.

Here is a list of the different districts of Victoria from which the Railways Department gets its sleepers, together with the different kinds of timber which comes from each district:—

Bairnsdale-	About 50 per cent. yellow stringy-bark and
Bruthen	50 per cent. grey box, red ironbark and
districts	red gum.
Nowa Nowa-	80 per cent grey box and red gum.
Tostaree	20 per cent. mahogany.
districts	
Waygara-	80 per cent. yellow stringy-bark and
Orbost	mahogany.
districts	20 per cent. grey box and red gum.
Yarram-	Practically all yellow stringy-bark.
Woodside	
Yarrawonga	
Wangaratta	
Peechelba	
Rutherglen	
Cobram	
Tocumwal	
Picola Line	
Gculburn	
Valley (be-	Practically all red gum.
tween Arca-	
dia & Tally-	
garoopna)	
Cohuna	
Koondrook	
Balmoral	

And here is a list which shows you the average life of sleepers made from different kinds of timber:—

Red ironbark	25 to 30 years in Main Tracks.
and grey box	
Red gum	20 to 25 years in Main Tracks.
Yellow stringy-	15 to 20 years in Main Tracks.
bark and	
mahogany	

Red box and yellow box sleepers are now only available in very small quantities. These two kinds of timber have been practically worked out.

Owing to the climate and to the prevalence of white ants, the use of yellow stringy-bark and mahogany sleepers, which are the inferior kinds, is confined practically to the South-Eastern, Eastern and South-Western lines. The more durable timbers (grey box, red ironbark and red gum) are used in the Northern, North-Western and Midland districts.

Sleepers are not specially seasoned or given any special preservative treatment before they are placed in the tracks. The reason for this is that any benefits that might result would not be worth the cost. This applies more particularly to grey box, red ironbark, red gum and yellow box.

The ends of the sleepers, however, are coated with petroleum jelly to prevent them from splitting.

## Member Has Wonderful Model Railway

### COMPLETE OPERATIONS EXPLAINED

**H**ERE is a photograph of the model railway which is laid out in the backyard of the home of a member of the Scholars' Club, Philip Jones, Black Street, Middle Brighton. It is called the Lloyborough Railway Company. The yard of the terminal station is laid out in accordance with standard practice. There are lines for express and slow trains, lines for goods trains with marshalling tracks where the trains are "made-up," a turntable for swinging engines and other vehicles, an engine shed, signal boxes and points. There are miniature passengers on the platform. Also there are the proper luggage porters and station staff.

#### Bridge, Lake and Tunnel

As the express leaves the station it passes over a concrete bridge, which spans a lake, and enters a tunnel through Applemount. The first station is called Alandale and the train passes

through it at a scale speed equal to approximately 70 miles per hour. Barkut Junction is the first stop and here another extensive system of lines, points and cross-overs is found.

#### 3½ Scale Miles Long

The track of rustless steel is of 1¼ inch gauge and the total length of track is nearly 3½ scale miles. The trains run to an actual time-table and the rolling stock comprises accurate scale models of the famous L.M.S. System of England. Steam, clockwork and electric locomotives are used to haul the trains and when seven trains are on the track at once it takes eight station-masters and drivers all their time to control them.

Trains have to be diverted onto their right lines, the positions of the various points and point levers have to be known and the trains must be shunted and made up in the approved manner. Lifting a locomotive, a carriage or a truck off the rails by hand is NOT DONE !

# Brakes Are Vitally Important On Trains

## HOW WESTINGHOUSE EXPERIMENTED

**H**AVE you ever stopped to think just how important the brakes are on a railway train? To tell the full story about the brakes would occupy many pages of the Bulletin. However, I have tried to press all the main points into a short article. Below is the first part. Read it carefully, and then you will understand when the second portion appears in the August issue of the Bulletin.

**S**OME railway engineers decided to get a locomotive and ten passenger cars on a straight piece of track without any hills on it and timed it. They found that from a standing start it took the locomotive six minutes and a distance of 3½ miles to work up to a speed of 60 miles an hour. When the train had reached that speed, they put the brakes on and the train stopped dead in less than 20 seconds and in 1,000 feet (one-fifth of a mile).

Then they decided to see what would have happened if the train had no brakes. So they ran the train at 60 miles an hour and then shut off the power and let it roll to a standstill. They discovered that it travelled nearly five miles before it stopped. In other words, they found that the brakes on a single passenger car were far more powerful than the locomotive that pulled the whole train.

### Wonderful Brakes

Those brakes were the famous Westinghouse Air Brakes, the same sort of brakes that we have on all of our trains here in Victoria. I am going to try to explain to you just how they do their wonderful work. But first of all, I want to tell you how they came to be invented.

In the first days of railways, people discovered that they needed such powerful brakes that they could not be worked by hand. So in 1853, a man named Loughridge invented what was called the Loughridge Chain Brake. This was worked by a long chain, which ran the whole length of the train under the carriages, and was arranged in such a way that when the chain was pulled

from the engine it applied the brakes on the cars.

The chain was wound up on a drum under the engine, and when the driver of the train wanted to put the brakes on, he operated a lever which forced a friction wheel attached to the drum against the engine wheel, and this turned the drum, wound up the chain and pulled the brakes on all the cars of the train.

This brake, however, was not good enough for a number of reasons. The chief one was that in the event of the chain breaking, the brake was useless. Then an American named George Westinghouse tried using a steam cylinder to operate the brakes under each car instead of the chain, the steam being conveyed by pipes from the engine.

### Winter's Adverse Effects

The idea was to have a steam cylinder under the engine and each car and use pistons to push the brake-blocks against the wheels. When the brakes were to be applied, the steam was passed along the train to the brake-pistons through flexible pipes from the engine. This brake worked very well when the weather was warm, but in winter the steam condensed into water and froze, and the brakes wouldn't work at all.

For a while it looked as though the chain brake would have to be used on trains after all, and then Westinghouse found that engineers were using compressed air in driving tunnels through mountains and that they were passing it through lengths of pipe as long as 3,000 feet.

This gave him an idea. He decided to try compressed air in his brake instead of steam. This worked so well that he applied for a patent in 1867, which was granted in 1869.

(TO BE CONTINUED)

## "TANK" ENGINES ARE USED IN MANY WAYS

**I**F you are interested in railways, you are bound to have read about "tank" engines and to have wondered why they are called by such an unusual name. "Tank" engines are so called because they carry their coal and water supplies in special containers on the engine and do not need a separate tender. They were first built and used in England and are still used there a great deal. In fact out of 20,000 steam locomotives owned by the four big British railway companies nearly 8,000 are tank engines.

Tank engines have been called the railway "maids-of-all-work," because they are used for so many different purposes. They are of three types.

There is the "side-tank" type, in which the water is carried in two tanks at the sides and the coal is stored in a bunker at the rear; the "saddle" or "pannier" type, which carries its coal in the same position, but in which the water supply is kept in a single container mounted over the boiler of the locomotive; and the "well-tank" type, in which the water supply is kept in a tank under the coal bunker.

In the "side-tank" type, the two tanks are connected by a pipe beneath the boiler, so as to make sure that the water level in both of them will be the same. If this was not done, one of the tanks would be emptied before the other

and the engine would be carrying too much weight on one side.

Side and well-tank engines have been used for every type of railway work, both passenger and goods, but the saddle-tank is used mainly for shunting. The special advantages of tank engines are their shorter length—as compared with tender engines—and their suitability in design for running in either direction—forward or back—without having to be turned around.

The first tank engine—a saddle tank—was designed and built in 1849. Perhaps the main reason why tank engines were not built previously was that the early British locomotives burned coke which took up a lot more room than coal and thus had to be carried in a large tender.

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# SCHOLARS' CLUB BULLETIN

August, 1938

No. 13

## RAILWAY TIME-TABLING BRIEFLY EXPLAINED

**H**AVE you ever wondered how time-tables are made up? Let us sit beside one of the Railway Department's experts, who makes up country train time-tables, and see how he sets about it. These experts have had years of practical experience in the running of trains, so that they know just how fast certain types of trains can travel and what the lines are like in every part of the State—where they are flat, have curves and grades. All these things have to be taken into account when a new time-table is being made out or an old one altered.

So, first of all, the speeds of the different types of locomotive are studied. Then the load of the train, gradients, curves and track conditions are considered. One of the most important things to be thought out is a convenient time of departure for each train.

The ideal, which the railways aim at—and accomplish—is: **NOT TOO EARLY**, either in the morning or the afternoon. The later the better. This enables people, who have come from the country to the city on business, to get their business done during the proper business hours of the day and then get their trains home afterwards. That is why most country and interstate trains leave in the evening.

Now, have you noticed that country train departure times are fixed at times that are easily remembered? You will find that they leave at times like 5 p.m., 5.5 p.m., 5.10 p.m., seldom at times like 5.3 p.m. or 5.7 p.m. or 5.13 p.m. This is done so

that people can remember the train departure time easily. It is much easier to remember 5.5 p.m. than 5.3 p.m. or 5.7 p.m. This is just another of the many little ways in which the railways give better service.

Most of the country passenger trains leave the city during the morning and evening peak suburban traffic periods. This is one of the most difficult tasks confronting the time-table experts. You see, the steam trains must be timed so that they travel through the closely-timed electric train services without causing delays.

Practically the whole of the country railway system is operated on single lines, and that means another big problem for the time-table men. Trains travelling in opposite directions on these lines are able to pass only at certain stations where a double or treble set of rails is provided. The time-table must, therefore, be arranged accordingly.

### Bill Smith's Letter

*DEAR MEMBERS*

**O**NCE again I have to make my letter as short as possible so that we can find room to print all the interesting articles we have for you this month, but this is all to the good really, as we want to give you as much news and information as we possibly can in each issue of the Bulletin.

I dare say that you are all very glad that the Scholars' Tours have started again. Some excellent ones have been arranged and I know that you will enjoy them.

I am glad to see more and more letters for me every day now, and I want to say that some of the members have sent me in some interesting questions, which I've been very glad to answer. If you keep on like this you'll soon know more about the railways than I do!

Well, goodbye until next month.

Your Pen Pal,

*Bill Smith*



**H**ERE is the fifth of our series of pictures showing Transport Through the Ages. You will remember that last month we showed you the Ancient Egyptians moving a huge stone image along the banks of the Nile by means of wooden rollers, from which wheels developed. In this month's picture we see a sturdily built wagon with very good wooden wheels. This was the sort of wagon used by the Romans. The Romans built such good roads that they were able to use wheeled vehicles, which only developed from the earlier wooden rollers, when the roads became good enough for them to be used. In the background you will see a Roman ship. This, too, is much better than the Egyptian one.

# How Goods and Livestock Trains are Made Up

**Y**OU will remember that some months ago we had a story about goods trains. Well, this month we are going to tell you some more about the making up and despatching of a goods train.

The first thing to be done, of course, is to load the goods into the trucks. This is done at various places. For instance, all light goods, which can be handled by men, and goods such as groceries, drapery and so on, are loaded in the Melbourne goods shed. Heavy goods, such as machinery, are loaded outside the shed by means of a crane. Coal is loaded direct from the ships into trucks at the Victoria Dock.

Livestock, such as sheep and cattle, are handled at the Newmarket stock yards, and "Transfer" loading (i.e., goods from the country, which have been brought to the city and have to be sent out again to another part of the State) is handled in yet another part of the Melbourne Yard.

The making up of the goods train is done by a leading shunter, who has two other shunters and one or two pilot engines to assist him. The leading shunter brings his pilot engine into the goods shed about 90 minutes before the train is due to depart and "lifts" the loading for his particular train.

He then takes it to the part of the yard where the train is being made up. When he has collected his goods from the other sections (coal, machinery, livestock and so on) he marshals his train.

## Load Restrictions

The leading shunter must be very careful not to overload his train. You see the locomotive is only capable of hauling a train which weighs a certain number of tons. If the weight of the train is 600 tons, then the shunter must see that this weight is not exceeded.

The marshalling of the trucks on a goods train is a very difficult job. First of all the shunters have to arrange their trucks in line and station order, so that they may be detached easily and quickly at their proper destinations, without disorganising the rest of the train. But, in addition to this, the shunters have a lot of other worries.

For instance, they must make sure that fragile, breakable goods are marshalled as far back in the train as possible, so that they will not be disturbed by the bumping of the locomotive when it is shunting. They must be careful, too, that livestock is not shaken about by shunting, as animals injure very easily.

## Careful Handling

For this reason, when livestock is being shunted there must always be a man near by to apply the brakes and save the stock from unnecessary jolting. Oil and petrol trucks are another worry in the shunter's life. They must be placed well forward in the train, so that in the event of fire they could be hauled clear quickly and shunted down a siding, well away from the rest of the train. The shunter has to see that, although the petrol or oil truck is placed well forward in the train, there is a certain number of trucks between it and the engine. For, of course, you cannot have a petrol truck too near a steam engine.

So you see that the marshalling and make-up of a goods train is not easy, and a shunter is a man with a very important and responsible job to do.

**T**HE young lady in the picture, Miss Monica Hillman, is a Stewardess on "Spirit of Progress." Miss Hillman was the first railway Stewardess in Australia.

There are three stewardesses on "Spirit of Progress"—the other two are Miss Edna Gaynor and Miss Kathleen Brooker—and they have all been members of the Refreshment Services Branch of the railways for several years.

These stewardesses perform all comfort services for women and children passengers. They are especially helpful to mothers with babies. They order any meals and refreshments that may be required in the compartments. One of these stewardesses in her smart, blue tailored costume and Glangarry cap travels with "Spirit of Progress" on every trip it makes between Melbourne and Albury, and Albury and Melbourne. This is just one more way in which the rail-



ways—our railways—render better service to passengers.

## LOOK FOR THESE LETTERS ON GOODS TRUCKS

**T**HERE are six different kinds of goods trucks which are used by the railways. They are known by letters which are painted on the side of the truck. These are the six classes:—

"**I**" trucks are the ordinary goods trucks. They are usually open, but goods conveyed in them are covered by tarpaulins in wet weather.

"**L**" trucks are sheep trucks.

"**M**" trucks are cattle trucks.

"**O**" trucks are what are known as "hopper" trucks and are used for the carriage of coal.

"**U**" trucks are covered trucks used for carrying perishables and urgent goods needing protection in all sorts of weather.

"**T**" trucks are the special refrigerator trucks in which butter, milk, fruit and meat are carried. They are fitted with troughs containing ice to keep the goods cool.

In addition to the letter which shows the class to which a truck belongs, it has other information painted on it including the tare—which is the weight of the truck when it is empty—and the loading capacity of the truck in tons.

When a truck is loaded, it is run onto a weigh-bridge—which is a huge sort of weighing machine—and it is weighed. Then the tare of the truck is subtracted from the total and the remainder is the weight of the goods which have been loaded on it.

# MECHANISM OF ELECTRIC TRAINS IS CAREFULLY EXAMINED EACH DAY

**I**N the June issue we had an article about the controls of an "S" Class locomotive. This month we are going to describe the controls of an electric train. Before we start, however, let us tell you what happens when a driver takes over an electric train before it sets out on its run.

**H**E is given 30 minutes to get his train ready for work. First of all he switches on the air-compressor, which compresses the air to work the brakes and raise the pantograph, and the dynamotor, which cuts the voltage from the overhead wires in half (that is from 1500 volts to 750 volts) to work the lights in the train. When the driver has switched on his air-compressor and dynamotor, he then inspects the train to see that everything is in perfect working order.

He goes over the train from end to end and makes sure that all the air-brake hoses between the different cars are coupled together and that the electric power cables between them are connected. He also gets into the driving compartment of each motor carriage and tests the controls to make sure that they are working properly.

## Safety First!

He does this so that, if anything went wrong with the controls in his compartment at the front of the train, he could come back to the next motor coach and drive the train from there. If he had to do this, he would put the guard up in the front of the train as a look-out, because he would not be able to see ahead himself, and the guard would be able to stop the train between stations if it were necessary to do so.

When the driver is making his inspection, he has to test everything. This means that he must move the train and try the brakes and the trip gear. Only in this way can he carry out the motto of the Railways Department—"Safety First"—properly.

Now that the driver has made his inspection, let us climb into his driving compartment with him and see the controls. We'll make a list of them, as we did with the controls of the steam locomotive.

1. **THE MASTER CONTROLLER.**—This is the handle, which the driver moves to send the electric current through to the motors. It has three positions. They are: **Off**, **Half Speed** and **Full Speed**. On the **Master Controller** is a wonderful safety device called the **Dead Man's Handle**. The driver has to keep his hand on the **Dead Man's Handle** all the time that the train is in motion. If he takes his hand off it, the train stops immediately. You can see how important this **Dead Man's Handle** is in cases of sickness.

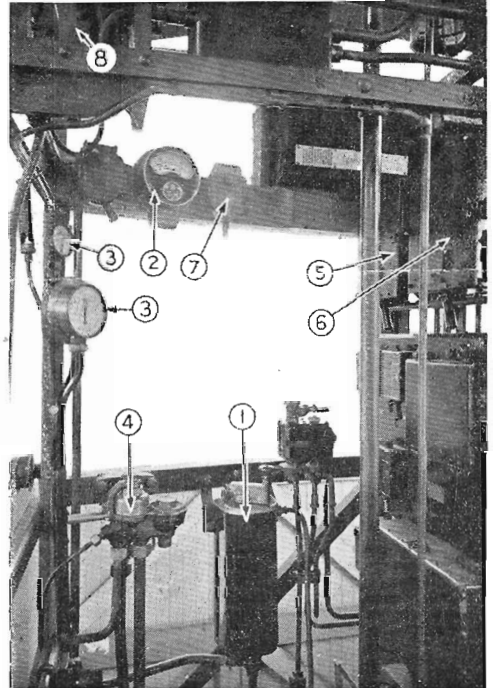
## Full Protection

If the driver were to faint and fall down, the train, instead of rushing on without a driver, would stop immediately. On the **MASTER CONTROLLER** there is also a special lock and key, so that the driver can lock the controller in the **OFF** position, when he is driving from the other end of the train.

2. **THE AMMETER.**—This is a special gauge, which tells the driver how much electric current is passing through the motors on his particular motor carriage.

3. **AIR PRESSURE GAUGES.**—These tell the driver how much compressed air he has in his tanks to work the brakes and pantographs.

4. **BRAKE VALVE.**—This is the valve which controls the supply of compressed air



to the **Westinghouse Air Brakes** on the train.

5. **AIR COMPRESSOR SWITCH.**—This switches the power on to the air compressor.

6. **DYNAMOTOR SWITCH.**—This controls the supply of power to the dynamotor.

7. **PANTOGRAPH OPERATING SWITCH.**—By means of this switch the driver raises or lowers the pantographs.

8. **THE CONTROL GOVERNOR.**—This is another very important safety device, which prevents any electric operation of the train at all, unless there is sufficient compressed air in the tanks to work the brakes. This **Control Governor** and the **Dead Man's Handle** are the two most important pieces of machinery on the train, because they guarantee safe running in any circumstances.

# Beginning of Westinghouse Air Brakes

IN the first part of this story in the July issue, you will remember that I briefly traced the history of the efforts to make proper brakes for trains.

The article covered the period up to when an American, George Westinghouse, started to work on a brake which would be better than the Loughbridge Chain Brake. Eventually, Westinghouse decided to try compressed air in his brake instead of steam. He was granted a patent in 1869.

**N**OW, this first air brake of Westinghouse's was what is called a "straight" air brake, and it worked as follows.—First of all the air was compressed by a special air-compressor on the locomotive and stored in a big iron reservoir.

From this reservoir it passed through the train along what is called the "train pipe," whenever the train driver operated his brake-valve. The compressed air operated a movable piston under each car, which by means of special "brake-rigging" forced the brake-blocks against the wheels and stopped the train.

This was a big improvement on the chain brake, but it was soon found that it had several defects. The chief of these was the fact that if there should be a break in the "train pipe" or in the flexible hose connecting the different cars, then the compressed air would escape and the brakes would not work.

This would happen, for instance, if a coupling broke on a hill and some of the cars began to run back down the line. It was at such times that the brakes were needed most. So Westinghouse set to work again, and in 1872 he invented the first automatic air brake.

## "Very Safe Brake"

The big advantage of this brake was that it came into use automatically, if the train parted or there was a break in the "train pipe." This made it a very safe brake, and the brakes which are fitted to all our trains today are made on exactly similar lines. The principle features of these automatic air brakes are what are called "triple" valves, so named because they perform three functions—charge a storage reservoir under each vehicle, apply the brake, and release the brake.

There is a "triple" valve and an air storage reservoir attached by the pipe to the brake-cylinder on the engine and each car of the train and all the "triple" valves are connected to the "train pipe." The "train pipe" and the storage reservoirs are charged with compressed air, when the brakes are off, but if the pressure in the "train pipe" is reduced then the "triple" valves apply the brakes immediately throughout the train.

The pressure in the "train pipe" may be reduced purposely by the driver or guard operating their special brake-valves or by a passenger pulling the communication cord, which opens a valve in the "train pipe" and lets the air out . . . or it may be reduced accidentally by a broken coupling or a break in any pipe connected with the "train pipe."

But no matter which it is, as soon as the pressure in the "train pipe" is reduced all the brakes go on and the train stops immediately.

You can see from this just how important brakes really are. Without brakes there would be no safety. Trains could not be run at high speeds if the brakes were not powerful enough to stop them in a very short time and distance.

In fact, it would be impracticable to build an engine powerful enough to start the train and

bring it up to a speed of 60 miles an hour as quickly as the brakes can stop it, when it is running at that speed.

The engine would have to be so big and powerful that the rails could not carry it. Those little brake-cylinders and storage reservoirs under the cars which are so small you hardly notice them are more powerful in effect than the modern locomotive, and they mean all the difference between danger and safety! (*CONCLUDED*).

## INTERESTING NOTES TO BILL SMITH

**W**E have picked out three of the most interesting letters from the large number that were written to Bill Smith during the past month, and which we think will interest other members of the Scholars' Club.

The first is from Lorraine Robinson, of West Brunswick, who wanted to know the size of the big oven at the North Melbourne Dining Car Depot. Well, this oven, in which all the baking is done for the dining and buffet cars and railway refreshment rooms, measures 20 feet by 16 feet.

Ralph Doherty, of Oakleigh, wanted to know about an extra rail which he saw on the Oakleigh line between Malvern and South Yarra. Bill Smith says that this was probably an extra rail, which was laid there as a conductor for the return current from electric trains. The reason for this extra rail is that, at that particular point, the track rails are of a special hard kind and are not good conductors of electricity.

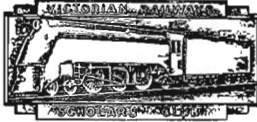
At nearly all curves and on bridges you may notice an extra rail laid inside the track. This is known as a check rail and is an extra safety device to prevent locomotives and carriages from running off the rails at that point.

Our third letter is from Don McMaster, of Rosanna. Don wanted to know first of all what was the cause of a greenish flare which he had seen coming from the pantographs of electric trains. Well, you will remember that we told you in our story about pantographs that if the pantograph breaks contact with the overhead wire the electric current causes sparking, which burns the wire to a certain extent.

Now, the colour of an electric arc in the air is bluish, but the overhead wire is copper, and as any substance containing copper burns with a green flame, the greenish flash is probably caused by the arc burning small particles of the wire.

Don wanted to know, also, why the speed on the Eltham line is restricted over portions of the run. This is done on account of the sharp curves.





# SCHOLARS' CLUB BULLETIN

September, 1938

No. 14

## 850 ELECTRIC CARRIAGES BEING REPAINTED

### Keeping Cars Clean

**F**OLLOWING its plan of painting its trains in pleasing colours, the Railways Department is painting all its electric cars Rose Pink and "Moonstone" Grey. The work is being done at the Jolimont Workshops which you will visit on your scholars' tours, and where every car is painted every three years.

The electric cars are cleaned in the Flinders Street car sidings, too, and about 850 cars are handled for cleaning each day. The carriage cleaning is done by a staff of about 150 men and most of it is undertaken during the day time, but a night shift of about 30 men is brought on to sweep and dust all cars stabled in the yard overnight. Those cars stabled at out-stations such as Essendon and St. Kilda are also swept and dusted during the night.

Every 10 weeks every car in service is washed on the outside with a weak solution of hydrochloric acid which takes off all the grime and grease. The windows are cleaned every five days and the interior of each car is swept and dusted whenever the car is placed in the yards, which is sometimes twice a day.

All cars are mopped out every three days with disinfectant and the ceilings are washed down once every six months for smoking cars and once every twelve months for non-smoking cars.

### Weather Effects

It has been found that, owing to the effect of the sun, which is always slightly to the north in Victoria, the north sides of cars fade more quickly than the south sides, and so as to make the fading more regular cars are turned around once every twelve months.

The cars are turned in this way.—A four-car train is sent around the Northcote Loop which reverses the direction of the train when it returns to Flinders Street. This is done between the morning and evening peak periods when there is not too much traffic on the Northcote line. Other cars are turned on the turntable outside the Jolimont Workshops.

In addition to painting and cleaning the cars, the men at the Jolimont Workshops also see that the cars are kept in good running order. Every 24 hours, and after every 3,500 miles of running, each car is brought into the workshops for inspection between the morning and evening peak periods, when every part is thoroughly inspected and repaired where necessary.

After from 50,000 to 60,000 miles of running—about once in every 15 months—every car is re-wheeled—that is, new steel tyres are put on the wheels or the old tyres are turned on the lathe.

### TRANSPORT THROUGH THE AGES



**H**ERE is the sixth of our series of pictures showing Transport Through the Ages. This picture shows a scene in the Middle Ages after the fall of the Roman Empire, when the splendid Roman roads had fallen into such a state of disrepair that it was not possible to drive wheeled vehicles along them. Men had to fall back on the use of pack horses again and it was not for several hundreds of years that good roads were again to be found. You can see from the picture, however, that men were still building good and bigger ships and, until good roads were built again, as much transport as possible was carried out by ships.

### DEAR MEMBERS

**Y**OU will notice that we have a great deal of news in *The Bulletin* again this month.

You will see in the articles references to some of the places which you will visit on your scholars' tours—if you have not already been there by the time this reaches you—and I know that you will enjoy them immensely.

I am still receiving many interesting letters from members each month, and I am sorry that we cannot find room to print them all.

I am glad to welcome a member from New Zealand, Jim Moorhead, who sent me a copy of the *New Zealand Railways Magazine*, which was most interesting.

Hope you all enjoy your school holidays. Good-bye to you all until next month.

Your Pen Pal,

*Bill Smith*

## Powers Machines Are Important In Railway Accounting Work

ONE of the most impressive of the many interesting Scholars' Tours is a visit to the "Powers Machines" Division of the Railways Accountancy Branch. Here work which by the old process of hand writing would take a huge army of people many weeks to do is completed by machines in a few hours. You probably all know that if a business is to be run successfully an accurate check must be made of all money earned and spent. In the Railway Department, which is Victoria's biggest business undertaking, this is done very largely by the "Powers Machines" system.

The system is worked by means of cards, in which holes representing figures are punched by trained operators who attain great speed and accuracy in the use of punching machines. The cards are of a standard size to fit the machines exactly, and are made from a special kind of paper so that they will stand the wear and tear arising from being frequently passed through the machines at great speed.

There are twenty-seven punching machines, seven sorting machines (which sort and classify the cards into groups according to the holes punched) and seven tabulating machines on which the information recorded on the cards is printed in columns of figures which are, at the same time, added up and a total given for each group of cards.

These machines are electrically driven and work at extremely high speed. As the work must be done with great accuracy the machines must be



*A punching machine operator at work in the Powers Machines Division.*

finely adjusted. Therefore, a staff of mechanics is employed in examining and regulating them at frequent intervals.

Thirty-five female operators are employed, 15 on punching machines, 10 on sorting and tabulating machines, and 10 on hand-operated adding machines, used for additions and calculations which cannot be suitably or economically done on the larger machines.

The "Powers Machines" Division checks returns of goods, live stock and parcels carried between railway stations, prepares special lists of the different classes of goods, supplies a record of the mileages run by trains, cars, and trucks, and classifies information relating to the labour and material required for jobs done in the workshops, so that the cost of each job may be obtained.

## LETTERS TO BILL SMITH

BILL Smith has handed us three splendid letters from the large number he received last month.

The first of them is from a New Zealand member, Jim Moorhead of Green Bay, Auckland. Jim sent over a copy of the New Zealand Railways Magazine, which Bill says is very interesting, and he had a lot of nice things to say about our "Spirit of Progress." We are glad to think that we have a keen member so far away as New Zealand and we are looking forward to hearing from Jim again.

The second letter is from Donald McMaster of Rosanna, who wants to know why "diesel-electric" engines could not be driven by the diesel motor alone and whether the truck handling arrangements at Yallourn could not be applied to the Melbourne goods yards.

Bill says that the power of a diesel engine varies with its speed. To get full power the speed of the engine must be kept up and therefore some kind of a gear-box is necessary, as in a motor car. This will allow the train to move slowly while the engine runs fast, and so full power is obtained at starting and going up hill.

For small powers an ordinary gear-box can be used, and for somewhat larger powers hydraulic transmission is often employed, but above a few hundred horsepower these are not satisfactory and an electric drive is best. The engine drives a generator whose voltage can be controlled either by the driver or automatically. The current from the generator drives the motors at varying speeds according to the voltage.

As for the truck handling arrangements at Yallourn, these were designed by the Victorian Railways for the State Electricity Commission to suit their special needs, which do not exist in our own goods yards.

### Brakes on Locomotives

The third letter is from Bill Fullerton of Wangeratta, who wants to know why the driver of a locomotive has two brakes to handle. Bill says that most locomotives have two brake valves, one called the "straight" and the other the "automatic."

The "straight" valve applies the brakes on the locomotive only and is used by the driver for steadying the train when going over small ups and downs of the track. He uses it, also, when driving a *light* engine, that is, an engine not pulling a train, or when shunting.

The "automatic" brake valve applies the brakes to all the vehicles on the train at once and is used for stopping the train or slowing it on very steep grades. Of course, there is also a hand brake, but this is used mainly when the engine is stationary, for instance, to hold it on a slope or in a siding.

## LOADING AND STOWING OF GOODS EXPLAINED

**W**E have had a story about the marshalling and despatch of goods trains, but so far we have not told you anything about the *loading* of trucks and the *stowing* of goods. The stowing of goods in trucks has to be done very carefully—especially if the truck is a "van" truck, that is a truck loaded for more than one station.

Let us pretend that we are watching the stowing of a truck at the big Number 3 Outwards Goods Shed at Spencer Street.

The truck is to be loaded with goods for six or seven stations, and the goods consist of all kinds of things from furniture to machinery. At work on the truck is a gang of four men, a stower, a putter-on who puts the goods on the hand truck, and two truckers to wheel the goods into the trucks.

A checker looks over the goods piled on the platform and tells the stower how many consignments there are for each station. The stower tells the putter-on the order in which the goods must be sent into the truck and then he stows the goods as they are brought in by the truckers.

### What The Stower Does

Now, all of this is not so easy as it seems, for a number of reasons. First of all, let us look at the stower's job. If you remember, there is generally only one set of rails on the country lines, and so, of course, there is usually only one platform at each station. But the platforms are not always on the same side of the line. At some stations the platform is on the "down" side of the line and at others it is on the "up" side of the line.

Charts showing which sides of the trucks the various goods for the stations have to be loaded

are supplied to the stower who must stow the goods for that station as nearly as possible to the side on which they will have to be unloaded.

He has to stow the goods in station order first. Thus, if he has to stow goods for six stations, then the goods for the first station must be the nearest to the door of the truck—and on the proper side—so that they can be unloaded quickly without disturbing the rest of the goods in the truck. The goods for the second station will be next and so on, until the goods for the last station will be stowed right at the ends of the truck.

### How Guard Helps

When goods are unloaded from one of these "van" trucks, the guard of the train must see that the remainder of the goods are restowed, and packed firmly into the space that is left.

The stower's job is made more difficult by careless people, who do not pack their goods properly. Very often the people at the goods shed have to stow large articles of furniture made out of highly polished woods. The stower must take particular care to protect the polished wood from scratches and other damage.

We have not sufficient space here to tell you just how many hundreds of thousands of tons of goods are handled at the Melbourne goods sheds each year, but when you go on your tour of the sheds you will be able to understand that the stowing of goods, frequently fragile and perishable and of every imaginable size and shape, demands considerable skill and experience.

## Peep Behind Scenes In A Booking Office

**Y**OU will remember that in a recent issue of the Bulletin we told you something about the history of railway tickets—how they came into existence and why the present form of ticket was decided upon. This month we are going to tell you a little more about the tickets used, and, at the same time, something about booking offices.

The chief thing required in the laying out of a booking office is to make sure that the dating machine and the tickets most in demand are placed as near as possible to the clerk's right hand.

Each of the ticket cabinets at the Flinders Street Booking Offices contains 1,100 different issues of tickets, while those at the various suburban stations contain from 500 to 800 different issues of tickets. This means, that at each of the windows within easy reach, the booking clerk has tickets for every station within the metropolitan area.

### Ticket Cabinets

The tickets are arranged in the cabinets in line and station order, running from left to right. For instance, all the tickets for the St. Kilda line will be in a line across the cabinet, so that, if the clerk is asked for a ticket for Albert Park, he has only to run his hand along the line and there it is. The tickets are also arranged in classes as follows.—1st singles, then *under* them 2nd singles, and *under* them 1st returns, and *under* them 2nd returns.

The special children's tickets range in price from one penny to 1/7d. They have the price

printed on them, but the name of the station for which they are sold is written on them by the booking clerk. Of course, where there is sufficient traffic to warrant it, a special ticket is printed. You can tell these children's special tickets from the full fare tickets, because a thick line is printed down the centre of each ticket.

All tickets which carry the passenger through Melbourne have a large "X" printed on them. This means that the passenger may break his or her journey at Melbourne and then continue it afterwards, and break it again at Melbourne on the way back, if the ticket is a return ticket.

Besides having to get tickets out of the cabinets quickly and give the correct change, booking clerks have to know the number of every ticket in their cabinets, and have to balance their cash against the number of tickets sold.

### Here's A Hint !

By the way, have you noticed the new "change plates" at Flinders Street? They are put there so that people—especially ladies wearing gloves—can scoop up their tickets and change quickly and easily. There is a flat plate alongside this scoop, which has the words PAY HERE painted on it. In spite of this many people WILL push their ticket money down the scoop instead of across the PAY HERE plate.

This means that the booking clerk instead of taking the money with his left hand and putting the ticket and change on the scoop with his right hand has to do both things with his right hand, thus delaying him in his work and causing delay to other people who are waiting to buy tickets.

## Interesting Sidelights On The Electric Suburban Railways

**W**HERE do the drivers of electric trains learn to drive? Well, we'll tell you. They learn to drive at the special Drivers' Training School located in Batman Avenue, near the Flinders Street railway station. At this special school there is a complete skeleton motor coach. It has two driver's cabins—one at each end—and all the usual controls, but no body or seats.

This coach is raised above the ground on concrete pillars so that the wheels can be driven around by the motors. It is high enough to walk under. This means that the drivers can SEE the various parts of the train actually working. The coach is worked by means of a pantograph and a small stretch of overhead wire in the usual manner.

Of course, drivers do not use the controls of this skeleton coach on their first visit to the school. Before they are allowed to do that, they are taught all the controls and connections of the train by means of special diagrams.

When they have learned the names of the different switches and controls on the train and have been taught what each one is for, they are shown the separate portions of the train—the different switches and so on—which are set up separately, so that they may be watched closely.

In this way the drivers learn just how each part of the train does its particular job.

When the instructor is sure that the drivers understand the working of the controls, they learn how to drive on the special skeleton motor coach. At the same time they are taught how to look for faults. This is done by means of certain tests which the drivers must carry out in the event of the train breaking down. The instructor at the training school will often deliberately make something go wrong with the motor-coach and then tell the drivers to find the fault by applying the tests they have learned.

The skeleton motor coach at the training school is fitted with the Westinghouse air brake equipment, of course, and the drivers are taught not only how to handle it, but how each part works.

After they have completed the course at the training school the drivers are taken out on the track with an instructor and, shortly after, commence work as fully qualified drivers.

If any driver has come from the country he has to learn all about the suburban tracks and signals, and be examined regarding his knowledge of them. Drivers of steam trains in the metropolitan area who qualify as electric train drivers are not required to be examined on tracks and signals.

### SPEED BOARDS

### HELP ON LINES

### WITH CURVES

**I**N the early days of electric trains in Victoria—before the drivers had had much experience of electrically driven cars—special signs, which were called "speed boards," were placed at regular intervals along the run.

The boards are not very high and have three arms. If the arms are fixed so that they all point upwards, then the driver runs his train at full speed. If they all point downwards, then he drives at half speed, and if they point straight out like

a letter "E," then he shuts off the power and "coasts."

Most of these speed boards have been removed, but there are still a few of them on lines where there are a lot of sharp curves and where the speed limit has to be kept low. One line on which speed boards are still used is the Eltham line out near Eaglemont.

Drivers "coast" wherever possible as it saves current. The motors on electric trains are so powerful that in most cases the driver shuts off power halfway between stations on a level track and "coasts" the rest of the way. Of course, when the line is running up hill, coasting is not possible and the power must be kept on all the time.

### BRIEF HISTORY

### OF VICTORIA'S

### ELECTRIC RAILWAYS

Railways were first electrified just prior to the beginning of the present century. Thirty years ago much progress had been made and the Victorian Parliament considered the possibility of electrification in the Melbourne suburban area. In 1908, it requested an English consulting engineer to make a preliminary report on the subject.

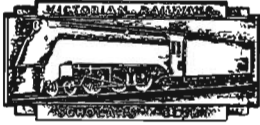
After some years of discussion this engineer wrote a further report, and about 1913 it was decided to proceed with the electrification. The Great War started in 1914 and this held up the work to some extent, so that it was not until May, 1919, that the first electric train began to carry passengers.

The first lines to be completed were the Melbourne to Sandringham and Melbourne to Essendon. The Victorian system was the first big scheme to use 1,500 volts Direct Current. In those days this was considered to be a high pressure, though nowadays 3,000 volts Direct Current is being commonly used.

When it was commenced, the Melbourne electrification was a big engineering feat, but since that date the world has seen the completion of larger schemes.

A Power Station to supply power for such an undertaking as an electric railway should be placed as near as possible to the centre of the railway scheme and also near to a large supply of water to be used for cooling a portion of the machinery.

It was for these reasons that the Railway Power Station was built at Newport at the mouth of the River Yarra.



# SCHOLARS' CLUB BULLETIN

October, 1938

No. 15

## Letters Show That Scholars' Tours Are Proving Interesting To All

**A**S we have had many enquiries about the Scholars' Tours, we thought it might be a good idea if we told you something about them. There are ten tours in all and they provide for the inspection of almost every important railway activity in Melbourne. They include visits to the construction and repair shops; goods, dining car and locomotive depots; power station, sub-stations, storehouse, printing works, telephone exchange, the telegraph and train control offices and the powers machines division.

Two teachers usually accompany each party of 48 scholars for whom the Railway Department grants specially reduced fares for travel during the off-peak period. On arrival at the local railway station, the party is met by a guide, who escorts it to the place of inspection where it is divided into four groups, each group being in charge of a guide who conducts it and describes activities in the various places visited.

If you are not a member of the Scholars' Club, you become one automatically when you make your first tour. Up to date, scholars have made over 20,000 individual inspections. The average number of inspections per week is about 1,000.

We have been very pleased with the large number of nice letters we have received from different schools that have sent parties on the last series of tours. Here is a selection:—

Haileybury College, Brighton Beach.  
"On behalf of the school and those boys who attended, I would like to express our thanks for the tour of the Newport Workshops conducted last Thursday afternoon. I should also like to thank those guides who so ably did their jobs."  
F. NORTHCOTT (Master-in-charge)"

Domestic Arts Adjunct, Brighton Street,  
Richmond.

"I am writing in appreciation of the way in which you organised our marvellous trip to the dining-car depot this morning. All the girls are very grateful for the pleasant tour and the happy time we had.

Thanking you once again, I am,  
BETTY SHARP (Form Captain)"

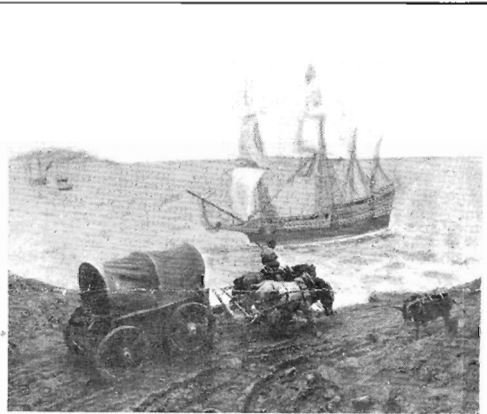
Williamstown High School.

"I have to state that students from this school took part in four educational tours arranged by your Department. It is a pleasure to record the reports of the teachers who are enthusiastic regarding the courtesy extended to them by your officers, the interest taken by the students, and the educational value to all concerned. All that they observed is closely connected with their school courses and the practical demonstrations add something of very great value, unobtainable in our schools.

The teachers desire me to associate them with this expression of appreciation.

I am,  
Yours faithfully,  
W. RICHARDS (Head Master)"

It is quite plain, you will agree, that the tours are proving every bit as pleasant and as interesting and helpful as the Department had hoped they would be.



**H**ERE is number seven in our series of pictures showing Transport Through the Ages. You will remember that our picture last month showed how the splendid Roman roads had fallen into disrepair during the middle ages and were so rough that only pack-horses could be used for carrying goods along them. This picture shows a typical road of the 16th Century—that is from the year 1500 onward. You can see that the roads are still very bad, although wheeled vehicles were in more general use, but the ship shown here is very much bigger and better than those of the middle ages. Even at this time most of the carriage of goods, if not of people, was made by water.

**S**HOW Week presents the railways with one of the biggest transportation jobs of the year. Rail traffic from all parts of the State is heavy on certain days, and yet this extra traffic must be handled, as well as the normal business, by the Department. To convey the huge army of country passengers, extra trains are put into service, while the time-tables of other trains have to be re-arranged. Carriages have to be allotted, locomotives assigned, train crews assembled and so on.

And there is the livestock to be considered. These valuable Show exhibits have to be carried quickly and, above all, with more than usual care, to avoid any possibility of injury on the way. Beside the stock, there are many truck loads of farm produce. These perishable goods also require fast and special transport.

# Carriage Of Goods And Livestock Is Huge Job

IN past issues of the Bulletin we have given you some interesting facts about goods trains, and we have told you how railwaymen handle highly-polished furniture, which is sent from the factories without packing. The handling of furniture, however, is only one of many similar problems which the railways handle with great skill.

THE goods service of the Victorian Railways is so well organised that important centres throughout the State are now served by goods trains which run practically as fast and as frequently as passenger trains. Business people in Melbourne, who put their goods on the evening trains, know that they will be available next morning to their country customers—often at places as far distant from the city as 200 miles.

In the same way, express goods trains carrying perishable goods and livestock from the country invariably reach Melbourne in time for the early morning markets. The train despatchers, about whom you read in the Bulletin some months ago, keep the goods trains under constant observation from the start of their journey to the finish—and that, of course, is a great help in ensuring punctual running.

## Hardly Any Risk

Whenever goods have to be carried from one place to another, there is always a certain amount of risk especially if the goods are badly packed, very fragile, or of awkward shape. No form of transport, whether by rail, road, sea or air can guarantee that among the millions of articles that have to be carried, every item of goods will be moved without any loss or damage. But the risk in the use of the railways for the carriage of goods is very small indeed.

Last year the freight handled by the Victorian Railways consisted of over 6,500,000 tons of goods carried an average distance of 128 miles, and 12,550,000 head of live stock carried an average distance of 125 miles. The ton mileage—that is the number of tons hauled one mile—was more than 927 millions.

The revenue earned by the railways in doing this huge job was in the vicinity of £5,000,000 and the job included the handling of millions of consignments. Goods as fragile as eggs and glassware, as bulky as electrical transformers and petrol storage tanks, as awkward to handle as cement culvert pipes and harvesting machinery, and as delicate as enamelware and highly polished furniture, unpacked and uncovered. . . . all these things were included in the job, yet the claims paid for damage, loss and delay amounted to less than £16 for every million tons carried one mile or, to put it in a simpler way, 3½d. for every 1,000 tons carried one mile.

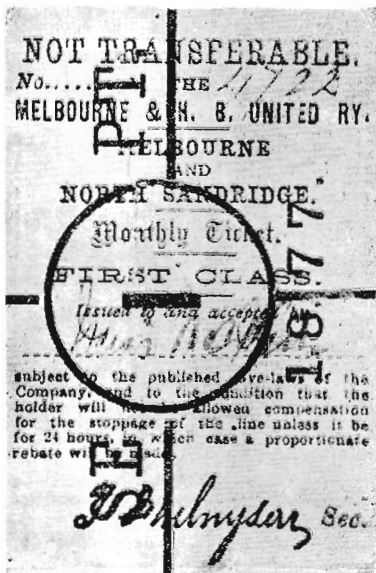
## All Kinds Of Trucks

The reason why there was so little damage is this.—The railways are transport specialists. They have the right kind of vehicle for every job. Solid, low-floored, flat trucks for heavy, unwieldy articles such as boilers, milling logs and out-size machinery; high-sided trucks for bulky goods; protected trucks for explosives; refrigerated trucks for butter; ventilated trucks for fruit; specially designed trucks for sheep and cattle; tank wagons for oil and petrol and for carrying water to drought-stricken areas—all this equipment and a highly trained and skilled staff are the reason why the railways are able to handle any kind of transport job.

A MUSTY flavor of early rail-ways ling-ers about the railway ticket re-pro-duced. It is one of two old tickets of historical interest that have been pre-sented to the De-part-ment. The ticket was issued by the Mel-bourne and Hob-son's Bay United Rail-way, and was a vail-able for first-class travel be-tween Mel-bourne and North San-dridge (now North Port) for the month of Sep-tem-ber, 1877. It is

1½ in. wide and 2½ in. deep and is backed with light yellow leather. The other ticket was printed specially for a Wesleyan Sunday School Excursion on November 3, 1903, from Graham Street (now Graham) to Riversdale and return. Both tickets are in an excellent state of preserva-tion.

## TICKET 61 YEARS OLD!



## DEAR MEMBERS

WELL, once again we have a fine budget of interesting articles for you, but I'm not going to spoil them for you by talking about them. I'm going to let you enjoy them for yourselves.

I suppose most of you have made at least one of the last series of ten scholars' tours and I hope that you enjoyed them. It is only when you go on one of those tours that you realise just how big the Railways Department really is.

Although I said I was not going to talk about any of the articles in this month's Bulletin, I must mention the one about the Goods Services. It will give you some idea of the wonderful job that your railways are doing.

By the way, Wal. Stanley, 402 Dorcas Street, South Melbourne, desires a pen friend interested in railway photographs, etc. A Scholars' Club Badge, with the letters "R.T." scratched on the back, was found behind the Repatriation Depot, St. Kilda Road. Please let me know who lost it.

Well, I think I'd better finish—so cheerio until next month.

Your Pen Pal,

Bill Smith



## HOW RAILWAY TRAFFIC FOR ROYAL SHOW AND MELBOURNE CUP IS HANDLED

**H**AVE you ever stopped to think of the hard work and careful organisation that are necessary whenever special trains are needed for such important events as the Royal Agricultural Show, the Melbourne Cup and the Derby? Thousands of people are carried by train to these big events every year and special trains, special tickets and special time-tables have to be arranged for each one of them.

Let us consider the arrangements for special trains for Cup Day. On Cup Day, the Victorian Railways carry about 50,000 passengers to the Flemington Racecourse and back. In order to do this fifteen trains—each consisting of eight cars—are used for the forward run and nineteen trains for the return journey. The peak period for the Cup is between 11.17 a.m. and 12.51 p.m. During that time 23 trips are made from Flinders Street and 12 trips from Spencer Street—a total of 35 trips in 94 minutes, or one train about every two minutes.

Each train takes about 13 minutes to make the run to the racecourse and it then has two minutes in which to discharge all its passengers—about 800—and pull out of the station to make room for the next train. In order to save the time that is taken up by the guard and driver in walking from one end of the train to the other, a guard and a driver are waiting on the platform when the train pulls in ready to step on board and take it out again, while the guard and driver who brought it in change ends in time to take charge of the next train, and so on.

### Picnic Parties, Too!

Now besides having to arrange all the special race services, the railways have to provide special trains for all the Sunday School picnics that are held on Cup Day, and this, too, takes a great deal of time and hard work. Every Cup Day picnic passengers to the number of about 20,000 are carried by ordinary and special trains to various places in the country and at the seaside. The number of passengers from each school may vary from 60 or 70 up to as many as 500, and the Railway Department has to know beforehand how many passengers will be coming from each school.

The Department, therefore, gets in touch with each school and supplies a certain number of special tickets according to the number of passengers expected. The Department then tells the Headmaster where to meet the train and even what section of the train has been reserved for his party—whether the first two carriages, the middle three, and so on.

### Here's A Surprise . . .

Although there are no Sunday School picnics on Derby Day, the job of arranging special trains to the Flemington Racecourse is every bit as hard as it is on Cup Day, because the Derby is run on a Saturday and the peak period of the race traffic is between 12 noon and 1 p.m.—just when everyone is coming home from work and the ordinary suburban passenger service is at its peak. This means that the special trains for the Derby have to be timed to run through the ordinary peak traffic. In spite of this eighteen race specials leave for the course between 12 noon and 1 p.m.—that's about one train every three minutes.

Show Week is another period of the year when large numbers of passengers have to be carried swiftly by train, and large numbers of special trains have to be arranged for and enormous quantities of special tickets printed. During Show Week in 1936, the Victorian Railways carried 156,000 passengers to and from the Showgrounds without a hitch, and on the Thursday, which, as you know, is the Public Holiday, 24,000 passengers were carried between 9 a.m. and 5.30 p.m., when 90 trips were made—about one train every five minutes for eight and a half hours. Due to the infantile paralysis outbreak, the railway traffic for the 1937 Show was not, of course, so heavy.

## Bill Smith Kept Busy—But He Likes It . . .!

**Y**OU will remember that last month we told you something about a letter which Bill received from Jim Moorhead, a member in New Zealand. Well, this month, we are going to tell you a little more about the letter which Jim wrote to Bill. Jim, who signs himself "A Sincere Member," has promised to send Bill the railway magazine from New Zealand every month in exchange for his copy of the "Scholars' Bulletin."

The magazine which Jim sent with his letter had some very interesting facts about the New Zealand Railways. Bill tells us that he was very impressed with the new electric trains now running on the Wellington-Johnstonville line. There were some photographs of them in the magazine and they looked very fine. Another very interesting article dealt with the history of the New Zealand Railways.

At present Jim is our only New Zealand member. He lives at Hornybrook Road, Green

Bay, Auckland, SW4, and he is a great admirer of our wonderful "Spirit of Progress." He has promised to send Bill clippings from the New Zealand newspapers, which deal with railways and locomotives. Good luck, Jim! We are all looking forward to hearing from you again soon.

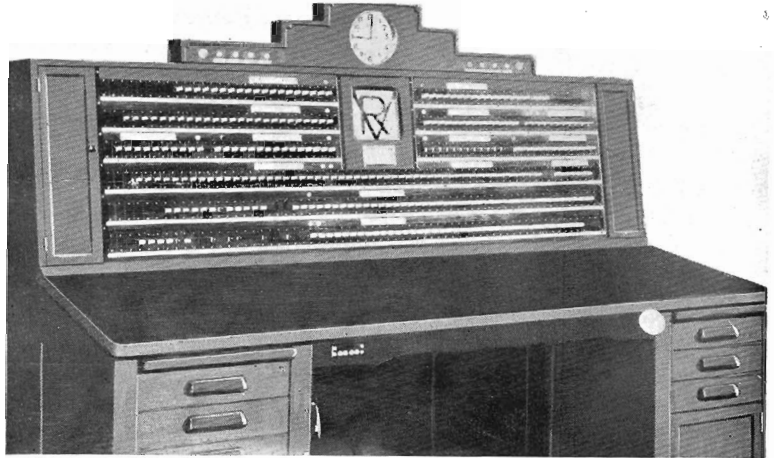
Bill also had a very nice letter from D. McPherson Roberts, of 68 Holyrood Street, Hampton, who is anxious to find a pen pal with whom he can exchange stamps. We suggest that he should write to Jim Moorhead, who, we are sure, would like to hear from other members of the Scholars' Club.

**B**ILL asked us to warn all members to take care of their copies of the Bulletin as they are in great demand from new members, who want all the back numbers, which we are not always able to supply. Gordon Smith, of Rosanna, has written to Bill and asked him, if he could send him the numbers one to twelve. Unfortunately we are unable to do this, although we have sent Gordon as many of the back numbers as we could. So take care of your Bulletins. If you should lose some you may not be able to replace them.



# WORLD'S BEST EQUIPMENT FOR NEW SUBURBAN TRAIN CONTROL

THOSE of you who have been on the Scholars' Tour through the Central Train Control Division in the Railway Offices at Spencer Street will at once recognise this photograph. I am sure you will recall the interesting time you had. For those who do not know, I must say that this is a photograph of a train despatcher's desk—actually the main one—in the suburban train control section which will be operating very soon. There are three desks altogether, and in them the most



up-to-date equipment in the world has been installed. To this main desk, all or part of the 220 lines on the other two desks may, if desired, be quickly transferred. When the train despatcher wishes to speak to a station all he does is to depress the right line key, rows of which you can see in the picture. When the station replies, the train despatcher hears the voice which is amplified through the loud speaker situated behind the grille with the letters "V.R." He then speaks through the microphone located in the square underneath the loud speaker. . . .

## *Victorian Railways Institute Plays Valuable Part*

**E**VEN after you leave school and start work, there is much to be learned. Recognising this, the Railways Department has been glad to help in establishing the Victorian Railways Institute. It is really a "night school" where railwaymen can study many subjects dealing with their every-day work. The Institute has also a sporting and social side of immense value to railwaymen.

The head office of the Institute is in the Flinders Street railway station building, and there are 15 branches in the country. It has 14,556 members, and of this number about 8,000 live in the metropolitan area. The membership of country centres ranges from 150 to over 500. The Bendigo centre, for instance, has 545 members. There are other country members in places where there is no branch of the Institute. If these members wish to study, they are taught by correspondence.

### Various Classes

Four thousand scholars attend the Railways Institute classes. These scholars study all sorts of special railway subjects such as Station Accounting and Management, Engine Working and Westinghouse Brake Control, Permanent Way Maintenance and Construction, and so on. Classes are also held in shorthand, typewriting, bookkeeping, etc. Members—who pay only 11/-

a year to belong to the Institute—can also learn singing, the violin, the piano, elocution or public speaking, in addition to the educational subjects mentioned.

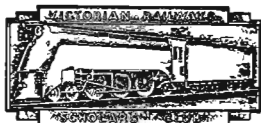
The Institute has its own library containing 40,000 books. Each year about 10,000 new books are added. There is also an orchestra of 65 performers which some time ago won the Orchestral Championship held at the Ballarat South Street Competitions. Incidentally, the Institute's Choral Society supplied portion of the choir for the concert which the famous singer, Richard Crooks, gave at the Exhibition Building, Melbourne.

### Sporting Activities

The Institute has a chess club, debating club, billiards club, wireless club—with its own short-wave station (3RI)—football league, with five clubs which compete for a cup and a shield, cricket association, tennis association, with 24 teams, table tennis association, golf club, hockey club, bowling club, amateur athletic club, and a very fine gymnasium where members can learn boxing, wrestling, jiu jitsu, weight-lifting and acrobatics. Two members of the gymnasium were in the team which represented Australia at the 1937 Olympic Games in Berlin.

\* \* \*

*Many thousands of railwaymen have benefited from membership with the Institute, and much more could be written about its activities. We hope to give you some more information about it in an early issue.*



# SCHOLARS' CLUB BULLETIN

November, 1938

No. 16

## VICTORIAN RAILWAYS ENGINEERS FIRST TO USE ARC-WELDING ON BRIDGES

**S**OME of you who have visited the Newport Workshops have seen men fusing pieces of metal together with electricity—a job which creates such a bright light that the men can only watch it through specially thick black glass. Well, this process is called arc-welding, and the Victorian Railways were the first in the world to use it for strengthening wrought iron railway bridges. The railway bridge over the Murray River at Echuca was the first in the world to be strengthened by arc-welding and this is how it came about. The Echuca bridge, which was built in 1876–1878, is a combined rail and roadway bridge and carries a great deal of heavy traffic. It had needed strengthening for a long time, but the high cost involved had prevented it receiving earlier attention.

**I**N 1922, however, the Victorian Railways, by the Border Railways Agreement of that year, purchased the Deniliquin–Moama railway line which ran across the Echuca Bridge. The engines which had been running on that line weighed from 58 to 62 tons, but the engines which the Victorian Railways intended to use weighed at least 95 tons. Thus the strengthening of the bridge became urgent. Failing that, a new one would have to be built.

### Heavy Traffic

The traffic over the bridge was very heavy—450 road vehicles passed over it every day and as many as 10 trains per day in the stock season. As the traffic could not be diverted—the nearest crossing over the Murray was 22 miles away—it was necessary to avoid delays during the repairs.

The Railways had to decide, therefore, whether to build a new bridge or to strengthen the old one in some way, without interrupting traffic. There were two ways of strengthening it; either by rivetting or by welding. The arc-welding process proved to be the most suitable, so that was decided upon.

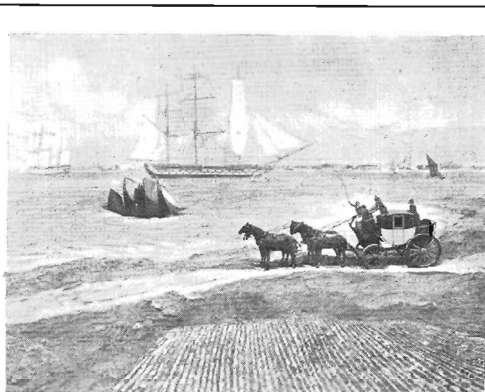
### Main Advantages

The chief advantages of arc-welding were :—

1. The saving in cost. A new bridge would have cost £55,000. Repairs by welding cost only £13,830.
2. There would be no interruption to traffic.
3. The time of carrying out the operations could be greatly reduced.

The work was commenced in March, 1925, and was the first serious application of electric welding to the repair and strengthening of a railway bridge. As the welding of new steel into old wrought iron had never been attempted anywhere in the world before, the railway engineers had to work out a way of doing it for themselves. This proved so successful that they used the same method in strengthening other bridges.

The news quickly spread and now the system devised by the Victorian Railways engineers is used by other railway engineers and bridge builders all over the world.



**H**ERE is the eighth of our series of pictures showing the growth of Transport Through the Ages. This is a scene in the 18th Century (between 1700 and 1800). You can see that shipping has improved tremendously. The ships are bigger and carry more canvas, and they look more seaworthy than the older types of craft. Land transport has improved, too, but not so much as shipping, because the roads are still far from perfect.

### DEAR MEMBERS

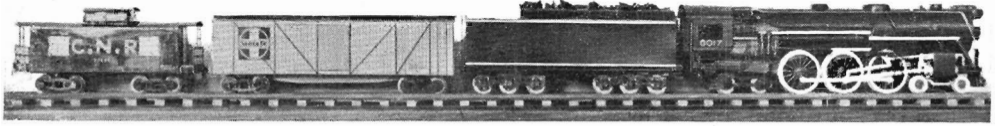
**I**T looks as though I shall always have to cut my letters to you short, because with every month that passes we seem to get more and more news of interest into the Bulletin, with the result that there's less room for my little message. Still, perhaps that's all for the best.

Among the letters of special interest that came to me last month were two from our New Zealand member, Jim Moorhead, and a very interesting one from Jim Douglas. You will find both these letters answered in this month's Bulletin. They are very interesting.

Your Pen Pal,

*Bill Smith*

## STUDENTS BUILD FINE MODEL RAILWAY



THE model locomotive and rolling stock pictured here were built by pupils of the Christian Brothers' Technical College, South Melbourne, who have also constructed 65 feet of electrically operated double track of 1½ in. gauge. For the Annual Display in December, stations, buildings and other line-side accessories have been built. There are two 4-6-4 Hudson type locomotives and a 4-4-4 streamlined locomotive which hauls three streamlined passenger cars. There are also two ordinary passenger cars and 18 American type freight cars. All of this rolling stock was built by pupils at the College from accurate scale drawings. Several of the pupils have designed and built their own locomotives and cars. One has built a 12-wheel Pullman dining car from his own drawing. All the work is performed at the school and even the wheels and bogie castings are "home-made." These models are approximately 1/40th full size. In addition, there is a 5½ in. gauge model 4-8-0 type engine and Parlor car. A Pacific type locomotive for this gauge is also under construction.

## Tree Planting Along Railway Lines In Wind-swept Areas Helps Locomotives

ONE of the most unusual jobs in the Railways is carried out by the Department's tree-planters. In the past twenty years or so the Railways have planted thousands of trees along the various lines. One of the principal reasons for this activity is that the trees make natural windbreaks. On many stretches of line—especially between the towns of Maroona and Gheringhap in the western portion of the State—terrific winds at times blow across the plains and offer enormous resistance to trains. This means that the cost of running trains across those areas is increased considerably, because a heavy goods train, say, that is pulling into a strong diagonal wind has to burn much more coal than on calm days in order to overcome the pressure of the wind.

All through these areas the Department has planted thick belts of trees along the line to break the force of the wind and thus lower running costs. Already the Department has planted over 65 miles of line between Maroona and Cressy, and intends to plant a further 34 miles of lines between Cressy and Gheringhap. The area between Maroona and Gheringhap is one of the windiest parts of the State.

Of course, the trees are not planted in one continuous line. This is not always possible, because along some parts of the line the land is not suitable for the growing of trees. Again safety regulations prevent the tree planting for a quarter of a mile on either side of level-crossings, which are known in the Railways as P.C.R. crossings or PUBLIC CARRIAGE ROAD crossings.

This precaution enables the driver of a train to see in time if any vehicle is approaching the crossing. The whistling post, at which the driver *must* sound his whistle, is usually placed by the line about a quarter of a mile before the crossing and no trees are planted between it and the crossing.

### Other Purposes, Too

Trees are planted, also, around Departmental Residences—such as Stationmasters' Houses—for beautification purposes and to protect the buildings from strong winds. In some of the more barren parts of the State the trees and gardens around the Stationmaster's dwelling and the station itself are the only touches of green for many miles and are a very pleasant sight after miles of dry, grassy country.

Thick belts of trees are also planted around the Department's stock-yards for the sheltering of live-stock by the Department. These afford shade and protection to stock waiting to be sent away by train. This is particularly noticeable on the Balranald line, and is really a very valuable

form of that fine service for which the Railways are notable.

The next time you travel by train into the country, keep a look-out and you will see that practically every station and every stock-yard has a thick belt of cool, shady trees around it. Of course every station has not yet been planted, because it obviously takes time, but many are done and it won't be very long before the big job is completed.

## WERE YOU WONDERING ABOUT THESE "N" BOARDS?

WHAT are "N" boards? If you have been travelling lately on the Box Hill line or any other line that passes through Richmond, you will have seen square white boards bearing the letter "N" beside the line near where gangs of men are working on the reconstruction of bridges. Probably you have wondered why they were there and what the "N" stood for.

Well, the "N" Board stands for the word "Normal" meaning normal speed. You see, if a special reduction of speed is needed—due to track or bridge renewals, for example—a speed board is put up some distance before the spot where the work is being carried out. This tells the driver the maximum speed he is allowed to travel after he passes that board.

The "N" board is put up some distance beyond the place where the work is being carried out and indicates to the driver the point at which he can resume normal speed.

You will see "N" boards and speed boards at present on the line just before you reach Richmond station on the way out from town and on the Box Hill line between Burnley and Hawthorn.

## Railways Printing Works Amongst Most Modern In Australia

**T**HIS Bulletin is printed at the Railways Printing Works at North Melbourne, where most of the printing for the Department is carried out. The Department first began to do its own printing in 1892. At that time a small printing plant was bought, so that small urgent jobs could be undertaken more quickly and cheaply on the railway premises. As time went on it became necessary to buy more and more machinery until finally, in 1922, the Railways Commissioners decided that the system would have to be changed altogether, so that it could be managed more efficiently and more cheaply.

Old-fashioned and out-of-date plant was scrapped and modern machines and appliances were installed. The result of this improvement was that the Railways began saving nearly £4,000 per year.

Until July, 1929, all the printing was done in the basement of the Railways Administrative Offices in Spencer Street. As the amount of work increased and new machines were installed the room available was too limited for efficient working.

Fortunately railway premises at North Melbourne became vacant and the Printing Works were moved there. The advantages which came with the better conditions at the North Melbourne premises meant a further saving to the Department of at least £2,000 a year.

Most of you will probably have seen the Printing Works, which are included in the list of Scholars' Tours. For those who haven't yet visited the works here are a few facts of interest about them. The

building itself is 300 feet long, 100 feet wide and 24 feet from floor to ceiling. The roof is of the saw-tooth pattern and gives 1,800 feet of roof lighting, while the south wall contains 13 windows, each of which is six feet wide by eight feet high. These big windows, with the aid of the white walls, throw daylight into every corner, thus providing perfect lighting over the whole of the works. The building is perfectly ventilated, too, by means of 84 dome-shaped ventilators in the roof.

The machinery is so placed that all the different appliances for different kinds of work are close to each other. Special cabinets contain pages of time-tables ready set up in type so that alterations can be made and new time-tables printed in a hurry.

There are almost 65,000 different pieces in the stereo and block section, which, however, is so well laid out that it is possible to obtain any particular piece within 60 seconds. The machine section has been so arranged that the printers can reach any part of any machine quickly and easily in the event of a breakdown.

Straight lines through and around all the machines leave plenty of room for the modern transporter trucks which carry material from one section of the works to another.

The machinery is kept in perfect condition and is an object lesson in cleanliness. All loading and unloading is done at the rear of the works and a verandah protects vehicles in bad weather.

In addition to the actual machines, there is a large general office and a well-equipped lunch room for the staff. In the lunch room each man is provided with a steel locker to hold his clothes.

## INTERESTING RAILWAY TOPICS DISCUSSED IN LETTERS TO BILL SMITH

**B**ILL Smith has passed on to us three very interesting letters from the many he received last month... including two from our New Zealand member, Jim Moorhead. Jim had a lot to tell us about the New Zealand Railways and a lot to ask us about ours. He also sent us some very interesting catalogues. Jim tells us that there are a large number of single track lines in New Zealand and wanted to know if we had many over here.

All Victorian suburban lines have double tracks, and some of the country lines also have long sections of double track, but in places where there is only a single track we have the "staff" system. Jim tells us that they have a similar

### PEN FRIENDS WANTED

**H**YAMSON, of 86 Richardson Street, North Carlton, is interested in Meccano; A. Ellison, of Vallie Street, Eastoakleigh, in stamps and trains, and Alan White, of 10 Parke Street, Pascoe Vale, in model railways, chemistry and stamps. He would like to correspond with any friend of Jim Moorhead's in New Zealand.

system in New Zealand which is called the "tablet" system. A single line is sometimes a bit of a nuisance, but it is not always profitable to build a double set of tracks.

Here is a letter from another Jim—but one who lives a little bit nearer than Jim Moorhead. This letter is from Jim Douglas, of Napier Street, Footscray, who has brought us another new

member for the Club and three questions. He wants to know.—(1) Which suburban station handles the most passengers. (2) Which suburban station takes the most money. (3) Where Footscray comes on the list.

You Footscray members will be glad to hear that Footscray earned the greatest revenue of all the suburban stations for the 12 months, which ended on June 30 last. Footscray earned £56,438 from 3,386,401 passenger journeys. Actually St. Kilda handled more passengers—the number being 3,663,020—but, because of the smaller fare, the revenue was less than Footscray's.

Our final letter for this month is from Wal. Stanley, of 402 Dorcas Street, South Melbourne, SC5. Wal. brought us another new member and a question about fog-signals.

Fogs in the metropolitan area make it impossible for the drivers of trains to see the signals, so that a man called a fog-signalman is employed to convey the message of the signal to the driver. This fog-signalman has a supply of detonators and he places these on the line to indicate the position of the signal.

The movement of the train over the detonators causes them to explode, the noise attracting the attention of the driver who looks for directions from the fog-signalman. At busy junctions where trains are running on closely-adjointing lines fog-signalling machines are used. These machines place the detonators on the line, thus eliminating the danger to the men at these points.

## Victorian Railwayman Is Wonderful Writer— Yet He Dislikes Using A Pen!

WRITING  
YOU  
SHOULD  
ALL  
TRY  
TO  
COPY....

HERE IS Mr. A. H. Davern and a sample of the copperplate handwriting which one reads in his periodic reports as Firewood Inspector of the Stores Branch, Victorian Railways. Taught at school how to write and to hold his pen correctly, Mr Davern has simply carried on and the march of time sees no falling off in the standard of his writing. Big and small writing do not worry him at all. For



*"Spirit of Progress" is the train of to-day and to-morrow. In its grace of outline, decorative beauty and air-conditioned efficiency it is the last word in train construction in the Southern Hemisphere.*

instance, he wrote an elaborate invitation card for the Mayor of a suburban city; he has also written the Lord's Prayer in the space of a three-penny piece. School children have had his work displayed to them in the hope that they would try hard to write as well as he does. Although you might think so, he is not a slow writer. Sufficient proof of that is the fact that for 12 years he was the correspondence register clerk of the Stores Branch. Volume—plus clear writing—was necessary on that job. And here's a surprise: he hates using the pen! "I avoid it whenever I can," he says with great determination. "I mostly use a pencil; maybe a pen only once a month . . ."

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## Sport Is Important Feature Of Victorian Railways Institute's Work

IN the last issue of the Bulletin we told you something about the Railways Institute and its different sporting clubs. This month we want to tell you a little more about the sporting side of the Institute's activities.

First of all there is the Billiards Club. Up to the present time this club is fourth on the premiership list of the Melbourne Billiards Clubs' Association. The Institute also has a team in the Brighton and District Billiards Association Competition. This team just failed to win the premiership in the Brighton district last year, but is well ahead this year.

In all the matches in which the Institute's teams are engaged you see billiards of the highest standard played by some of the leading amateur players of Victoria. So the Railways are justly proud of their two teams which are always near the top of the list.

### Interstate Railway Football

The Institute has its own Football League consisting of five teams—Melbourne Goods, Northern Suburbs, Flinders Street, Spotswood Shops and North Melbourne Loco.—which compete for the Institute Shield and a Cup donated by the Railways Commissioners. There is an Interstate Railway Football Carnival played every year in Melbourne, Sydney or Adelaide. This year it was played in Sydney and the Victorian team won.

The Railways Institute Cricket Association, which is over thirty years old, consists of nine teams from the various branches and lines in the

metropolitan area. All matches are played on turf wickets at Royal Park.

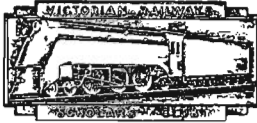
The Institute's Tennis Association runs its competition in two grades "A" and "B"—the "B" grade being divided into two zones. Altogether there are twenty teams in the Association, and before the finals in the competition are reached over 120 matches have to be played.

In addition to the contest between the various clubs for the "Dunkling" Cup, there are two other championships—the open singles championship, which is divided into two grades, and the doubles championship. There is also an annual Interstate carnival, which will be held in Adelaide next year in March.

### Table Tennis Popular

Table Tennis is another sort of tennis which is very popular with members of the Institute. The Victorian Railways' Table Tennis Association was only formed in 1937 with six teams, but there are now 12 teams in the competition. Two Institute teams played in the finals of the Victorian Table Tennis Association, one being runners-up in the Grand Final.

Space does not permit us to tell you very much about the other sporting clubs in the Institute, but there is a Golf Club, a Hockey Club and a Bowling Club—not forgetting the Amateur Athletic Club and the Gymnasium. The Hockey Club is seven years old and the Bowling Club only two years old, but, like the Amateur Athletic Club, they both have a very high standard of play.



# SCHOLARS' CLUB BULLETIN

December, 1938

No. 17

## "MANY HAPPY RETURNS"

### "Spirit of Progress" Completes First Year of Service

ON the 23rd of last month "Spirit of Progress" celebrated its first birthday. During the first year of its life our wonderful train received high praise from many visitors from other lands, who were delighted with its handsome appearance, high speed, safety, cleanliness, comfort, smoothness in running, quietness, air-conditioning, and lighting (particularly lighting for each seat). They have ranked it with the best and most modern trains in other parts of the world.

In every respect "Spirit of Progress" has been a wonderful tribute to the skilled Australian workmen who built it at the Newport Workshops.

During the 12 months, "Spirit of Progress" covered 139,065 miles between Melbourne and Albury at a mean average speed of 50.88 miles per hour. This speaks very highly for the reliability of the streamlined "S" class locomotives that haul the train.

It must be remembered, too, that there are only four of these locomotives to haul the train and that the top speed is limited to 70 miles an hour.

## "GZ" TRUCKS FOR BULK WHEAT

A MONTH or so back we had an article in the Bulletin about the various classes and types of trucks, which are used by the Victorian Railways for hauling freight. We told you about sheep trucks, fruit trucks, timber trucks, petrol trucks and so on. This month we have a new class of truck—the "GZ" class.

"GZ" trucks have been evolved by the Railways for the bulk-handling of wheat. Bulk-handling means handling loose in large quantities. The wheat is not put into bags, but is merely poured into the trucks through special chutes.

The "GZ" trucks are really the same as the old "IZ" trucks, except that they have special fastenings on the doors, which makes the doors wheat-proof. They can be used for hauling the same sort of goods as the "IZ" trucks, when they have a loading capacity of 27 tons. But when they are used for the bulk-handling of wheat, they can only carry 20 tons.

"GZ" trucks are open trucks which are covered with a tarpaulin in wet weather. They were first constructed in 1928 as "IZ" trucks. The class "GZ" with the special door attachment were started in 1935. The Railways have 733 "GZ" trucks at present and are still building them.

## A Personal Message to You!

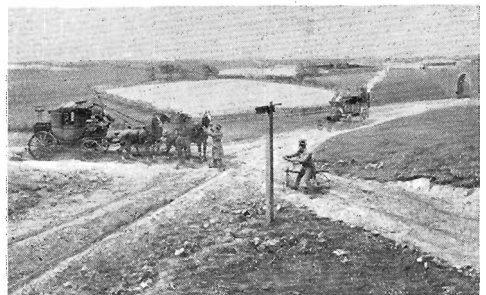
I WANT you all to do your bit towards making a huge success of the campaign to get people to "SHOP EARLY—POST EARLY—TRAVEL BETWEEN 10 and 4." Now, just a word or two about each point. Most of you know the hustle and bustle in the city at Christmas time. Struggling through the crowded streets, and crushing in the shops . . . But there's no reason why it should be like that. By doing their shopping early, people can move about more freely and take time to pick out the things they want to buy.

To "POST EARLY" is to make sure that your Christmas cards and presents will reach their destinations BEFORE Christmas—which is, of course, much better than AFTER Christmas! Besides, posting early makes life a little easier for the postal people. You can't imagine the enormous job they have in handling millions of letters and packages in the rush days of Christmas.

And now "TRAVEL BETWEEN 10 and 4." This is where you should all be keen to help! We want the people to travel as early as possible, especially when leaving the city. We want them to travel home before the trains are crowded with people returning from their work. If they don't, well you can easily realise the discomforts for everyone in crowded trains.

Remember this: it is cheaper to travel in the off-peak period! Yes, on Mondays to Fridays inclusive (Public Holidays excepted), the railways issue return tickets at little more than single fare for travel to Melbourne from outer-suburban stations and stations on the electrified lines outside the suburban area. These tickets are available by trains timed to arrive at Flinders Street or Princes Bridge not earlier than 10 a.m. and depart not later than 4.30 p.m. The minimum fares are: first-class, 1/-; second-class, 9d.

*Bill Smith*



HERE is the ninth of our series of pictures showing Transport Through the Ages. This scene is about 1831. You will see many remarkable things about it. First of all there are MORE FORMS of transport than in the other pictures, and the roads, though still very bad, are much better than they were.

In the picture can be seen a gentleman riding an old velocipede bicycle, which was one of the earliest forms of cycle. It had no pedals and no springs. The rider merely sat astride it on a hard wooden saddle and pushed himself along with his feet. Near the velocipede is a mail-coach, while approaching them is a steam vehicle, the forerunner of motor cars before the invention of the internal-combustion engine.

# LET YOUR PARENTS READ ABOUT THE BIG REDUCTIONS IN SUNDAY FARES..!

Commencing Sunday, December 4

For travel between suburban stations, including Melbourne, and as far as the terminals on the electrified lines, viz. :—Frankston, Upper Ferntree Gully, Lilydale and Hurstbridge. . .

## EXAMPLES

### DAY-RETURN TICKETS AT LITTLE MORE THAN SINGLE FARE.

For a journey of 26 miles (13 miles each way), say, from Box Hill to Gardenvale :— Old fare, 2nd class return, 1/8½, **new fare, 1/2.**

### MAXIMUM RETURN FARES FOR CHILDREN UNDER 16 ANYWHERE IN AREA MENTIONED; 2nd class, 6d., 1st class 9d.

(a) From any station in the suburban area, say, Footscray to Frankston :— 2nd class return, **6d.**

(b) For a journey of 20 miles (10 miles each way) by two adults and two children—one under 14 years and one over 14 and under 16 years :— Old fare, 2nd class return, 4/3, **new fare, 2/8.**

### FAMILY EXCURSION TICKETS at very low rates for 2 adults and four children up to 16 years on issue at all suburban stations to Upper Ferntree Gully, Greensborough, Eltham, Diamond Creek, Hurstbridge and Lilydale, as well as to the Seaside and the Zoo . . .

For a journey of 65 miles (32½ miles each way), say, from Williamstown to Upper Ferntree Gully :— Two adults and four children, including two children over 14 and not more than 16 years :— Old fare, 2nd class return, 17/1, **new fare, 6/-.**

*Reduction of 10% in the Sunday special return fares for organised parties paying 20 adult fares. One free ticket will be issued to the organiser of each such party.*

**EXAMPLE:** A party of, say, 21 adults making a 2nd-class return journey from Melbourne to Diamond Creek :—Old fare, £2/5/6; **NEW FARE, £1/10/-** (including a free ticket to the organiser). In other words a travel cost of less than 1/6 per person.

**Further Details Are Available At All Railway Stations . . . !**

## How Victorian Railways Save Money By Reducing Amount Of Coal Consumed

**T**HE coal bill of the Victorian Railways is about one-fifth of the total expenditure on materials. Every year thousands of pounds are spent on coal, and you can understand that the Railways are always looking for new ways in which either the amount of fuel used may be cut down or else a greater amount of work can be done with the same amount of fuel. This year, only 25 lb. of coal were used for every 100 gross ton-miles hauled by locomotives, whereas in 1921, 38 lb. of coal were used. The Railways coal bill this year would have been £240,000 greater if the consumption had been the same as in 1921. This great improvement has been brought about by several means.

**W**HEN the Railways decided to try to cut down the amount of coal used each year, Fuel Conservation Committees were formed in each district. These committees, which meet every two months, are attended by all grades of employees and meet in different places in their districts.

They discuss various ways and means of increasing the efficiency of the service and thus lowering the consumption of coal. For instance, by altering time-tables and speeding up the service less time is taken by a train to get from the start of its journey to the finish and so less coal is burnt. Standing time is the most expensive part of the journey as the engine is burning coal all the time to keep up the steam pressure.

Engines are most efficient when they are running at a steady rate of speed and are hauling just the right load. Unnecessary stops and underloading are two of the principal causes of fuel waste. Properly arranged time-tables and carefully adjusted loading prevent fuel waste.

Other ways in which coal consumption is cut down are by teaching drivers and firemen the proper way to fire and drive locomotives and by properly servicing the boilers. The rules for servicing the boilers of engines are laid down and must be followed by the Locomotive Depot Staff. Everything is planned and supervised. Nothing is left to chance.

The design of locomotives is being improved constantly. For instance, the new modified front-end has improved the power of the Victorian Railways locomotives concerned at certain speeds by up to 40 per cent. Locomotives are being tested constantly by the dynamometer car—about which you read something in the Bulletin earlier in the year—in order to improve efficiency and cut down fuel costs.

Track strengthening is another way in which fuel costs may be cut down because a stronger track allows heavier locomotives and longer trains to be used and so reduces the number of trains needed. A large locomotive is usually more economical than a smaller one.



## Rails Serve In Many Useful Ways After Removal From Tracks

**T**RACKS on the Victorian Railways are being constantly improved, and old, worn rails are being replaced by new rails. These old rails may be worn slightly on one side, if they have been placed on a curve, or they may have worn a little on the end . . . just enough to make any train that passed over them sway a little too much to be perfectly comfortable. As the Railways never waste anything that can be of further use they do not throw away that old steel just because it was unsuitable for its old job as a rail. Nowadays, every rail that is removed from the tracks serves some useful purpose.

**H**ERE are just a few of the many ways in which the Railways use up old rails. The Signals Branch uses a large number of them as telegraph poles. Old rails make splendid telegraph poles—especially in districts where there are termites or white ants, which would quickly eat away wooden poles.

The Signals Division also uses old rails for supporting various kinds of signalling apparatus. They are used also in the erection of certain types of railway buildings.

Many road-bridges over the railway have old rails to carry the roadway. The rails are placed across the track and the whole space between the rails and slightly above the rails is filled with concrete. After the concrete has hardened, the roadway surface is formed.

In the Structure Division, some very good uses have been found for old rails.

Because steel is stronger and more lasting than timber, the timber deck (or surface) of some old bridges has been removed and replaced by rails touching each other. The bridge is thus made stronger and is able to carry heavier locomotives.

Most new bridges are now built in steel and concrete because these materials will last a considerable time. When small openings are needed below the track for drains or for subways, the most convenient way of carrying the track across the opening is to cut the old rails to the length required, fasten them together in sets of three and encase them in concrete to form a slab. Three of these slabs placed under each track rail are strong enough to carry the heaviest engine.

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### DEAR MEMBERS—

*This is the only chance that I shall have of wishing you all a Happy Christmas, so, although it is really rather early, I shall do it. I hope that you WILL all have a Merry Christmas and a Happy New Year.*

*I suppose you are all looking forward eagerly to the holidays, and I hope that those of you who will be going away will be lucky enough to travel, if not on "Spirit of Progress" which had its first birthday last month, at least on one of the other fast trains that will be taking thousands of holiday-makers to some of the lovely resorts we have in Victoria.*

*By the way, Doug. Simpson, 40 MacGowan Avenue, Glenhuintly, wants a pen friend interested in printing, and Olympia Cecil, 137 Highett Street, West Richmond, would like to correspond with a pen friend keen on trains.*

*Bill Smith*

## FOUR AIR-CONDITIONED BUFFET CARS BEING BUILT

### Passengers Will Like Them

**T**HE Railways are now constructing four all-steel, air-conditioned buffet cars for use on busy passenger lines. Two of these cars, which are constructed of Corten steel—the same steel which was used for the "Spirit of Progress"—will be used on the Albury run. The Cor-ten steel is lighter and stronger than ordinary steel, so you can see from this that Cor-ten steel is really the ideal material for the building of strong, safe railway vehicles.

Of the four new buffet cars, two will have seating accommodation for 27 passengers, whilst the other two will seat 19 passengers. Each of the cars has a different colour scheme. The tonings are all in pastel shades. For instance, one of the cars is painted in biscuit colour. It tones up from a dark, brown floor covering, through lighter shades of brown, to an almost cream coloured ceiling. The seats of this car are upholstered in tangerine leather.

### Special Lighting

The first of the four cars is lit by centre-trough lighting. That is, the lights are hidden in a trough of opal glass which runs down the centre of the ceiling of the car and throws the light onto the ceiling from which it is reflected through the saloon. This sort of lighting is very soft and pleasing, and illuminates the car fully.

The other three cars have a new type of lighting. They are fitted with what are called modern "louvred" ceiling lamps flush with the ceiling. The front of the counter in each of these new buffet cars is also illuminated.

The new buffet cars are all streamlined and there are no projecting corners on any of them. Another improvement in these cars is that gas is no longer used for cooking. Slow-combustion coke stoves will be installed.

All the heating of food, soup, drinks and so on, is done with steam generated at the stoves. The interior of each kitchen and service section of these cars is lined with stainless steel. All the heating and cooking equipment, such as tea and hot-water urns, is made at Newport from this wonderful material.

### Varied Meals

You can get grills and light refreshments on these new buffet cars, as well as ice-cream, fruit and drinks. All drinks and ice-cream are stored in electric refrigerators.

All the cars are air-conditioned, and no matter how hot it is outside the train, you can sit and sip your cool drinks and eat your ice-cream in coolness and comfort as the train carries you swiftly on your way.

## RAIL MOTORS ARE VALUABLE VEHICLES ON BRANCH LINES WHERE TRAFFIC IS SMALL

**Y**OU have all heard about the Victorian Railways' rail motors, but as few members of the Scholars' Club have ever seen them, we are going to tell you something about them. Certain of the rail motors used by the Victorian Railways are ordinary motor cars, fitted with steel wheels with flanges so that they can run on rails. Each car can carry ten passengers and the top speed at which they are allowed to run is 45 miles per hour.

All these rail motors are used on branch lines on which the traffic is small. Now there are no turn-tables at the ends of these lines, but the rail motors carry their own turn-tables with them. These turn-tables are attached to the undercarriage of the rail motors and work on almost the same plan as a motor "jack." When the rail motor reaches the end of its run, the driver operates the turn-table attachment which raises the motor clear of the line on a pivot. The driver then swings the motor around on this pivot until it is facing in the opposite direction, lowers it on to the rails again, and drives off.

Rail motors are used on the following lines:—Birre-gurra—Forrest, Murchison—Rushworth, Ararat—Maryborough, Shepparton—Katamatite, Horsham—Goroke.

In addition to the rail motors themselves—of which there are six altogether—the railways have a number of light, two-wheeled trailers, similar to the ordinary car trailers which are used for carrying goods.

Another unusual type of train used by the Railways on branch lines and short runs, is the petrol electric. The petrol-electric train generates its own electricity by means of a petrol motor. The current is fed directly from the generator to the electric motors which drive the train.

### Top Speed Nearly 60 M.P.H.

Petrol-electric trains are used on the following lines: Melbourne to Geelong; Melbourne to Lancefield; Traralgon to Maffra; Bendigo to Swan Hill; Dimboola to Serviceton; Murtoa to Hopetoun; Yarrowonga to Benalla; Ultima to Korong Vale; Melbourne to Whittlesea.

Petrol electric trains, which develop 220 horse power and have a top speed of 58 miles per hour, can pull three trailer cars. White corner-wise bands are painted across the front to make them more noticeable to pedestrians and vehicles when they are approaching level crossings.

## "Double-headed" Locos. Explained Here

**T**HIS little article was suggested by a letter which Bill Smith received from one of our members, Jack Izzard. Jack wanted to know just what happened when two locomotives were hauling the same train. Bill thought this would make an interesting article for this month's Bulletin, and here is the answer.

When two engines are used to haul a train, the driver of the leading engine has charge of the air brake and can apply all the brakes on the train, including the brake on the second engine, by working the handle of his driver's brake valve. The driver of the second engine does not operate the air brake, except when he is told to do so by a code whistle from the driver of the leading engine, or in cases of emergency.

### Code Whistles

To start the train, the driver of the leading engine indicates to the driver of the second engine, by means of a code whistle, that he is ready to move and, when the driver of the second engine whistles back to show that he has heard the signal, the steam regulator valves of both engines are opened.

The acceleration of the train depends on the total force exerted and, although the force exerted by each engine does not have to be the same, it is the duty of the drivers to endeavour to operate the engines so that each one does its fair share of the work according to the power it can develop. Two engines of the same class would, of course, be expected to supply equal power.

If the driver of the leading engine had to apply the brake suddenly, he would do so by operating the driver's brake handle and this would apply the air-brake on both engines and on all vehicles of the train.

## Letters To Bill Smith On Varied Topics

**H**ERE are three of the many interesting letters in Bill Smith's bulging mail bag for last month. Bill says he thinks he has more pen-friends now than any other member of the Scholars' Club, but he can still find time to write to more. The first letter was from Mary Montgomery, of Sutherland Street, West Brunswick. Mary wanted to know the size of the big oven at the North Melbourne Dining Car Depot. Quite a number of our members seem to be interested in that oven. Well, Bill tells us that it measures 20 feet by 14 feet.

John Dean, of James Street, Heidelberg West, wanted to know if the overhead electric wires are covered or not. Bill says that they're not covered but are bare. The dirt and grease that gathers on them makes them look as though they were covered. That is all.

The third letter was from Harry Hyamson, of Richardson Street, North Carlton. Harry wants a pen friend who is interested in Meccano and is aged from 10 to 13 years. Harry wanted to know something about the engines that haul "Spirit of Progress." There are four engines altogether. They are named Matthew Flinders, Edward Henty, Sir Thomas Mitchell and C. J. Latrobe, and they take it in turn to haul "Spirit of Progress." They are coloured royal blue, with two longitudinal bands of gold. The symbol "V.R." with wings is painted in gold on the front smoke box.

### Most Powerful

These locomotives are of the "S" class "Pacific" type (4-6-2) and are the most powerful passenger locomotives on the Victorian Railways. They weigh 221 tons, the driving wheels are 6 feet in diameter, and the length of the locomotive and tender is 85 feet 9 inches.