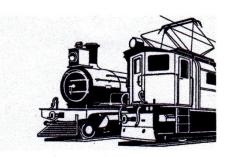
# Railway History Group

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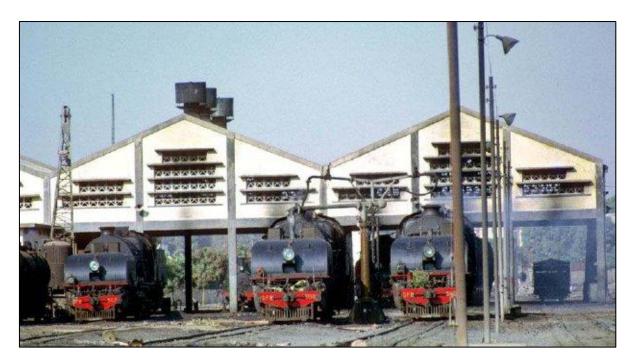


# Bulletin No. 113 November 2012



Cold day at Schoombie, on the Stormberg – Rosmead line; double headed Class 15ARs 2092 and 1818, on 6 Up, Cape Mail, July 1976. 17 coaches.

Photo: C P Lewis



CFB 10thD Class 4-8-2+2-8-4 oil-burning Garratts 367, 366 and 369 (batch 361-370, Beyer Peacock 7667-7676/1956). At the time of my visit (August 1972) all ten of these locos were allocated to Cubal shed for working the Benguela – Cubal section (164 km) (along with three 10thC Class wood-burners which had been converted to oil-firing, and some 10thC Class wood-burners which only worked as far west as Coruteva). The reason for purchasing oil-fired locos was presumably a cost saving measure, the arid nature of the Benguela – Cubal stretch requiring the costly transportation of wood fuel from further east. Cubal steam shed, Angola.

Photo: Peter Bagshawe

#### **Editorial**

This is the last Bulletin for 2012; the next Bulletin will go out in mid – January.

The Transnet tender, for 95 electric locomotives, has been awarded to a Chinese led consortium. For full details go to : <a href="http://www.engineeringnews.co.za/article/transnet-awards-loco-tender-to-chinese-led-group-2012-10-22">http://www.engineeringnews.co.za/article/transnet-awards-loco-tender-to-chinese-led-group-2012-10-22</a>

The winning bidder, in the PRASA coach tender, will be announced on December 12. For details, go to: <a href="http://www.citypress.co.za/Business/News/Prasa-tender-date-looms-20121124">http://www.citypress.co.za/Business/News/Prasa-tender-date-looms-20121124</a>

Only one member has still not paid subs for 2012. Thanks to everyone else for paying when requested.

Best wishes, for Christmas and New Year, to all members and their families from Leith and Wally.

Follow Up on Bulletin No. 111

On page 10 we published a photo and a drawing of two vehicles made by Alldays and Onions. Dave Littley has commented as follows:

It prompted me to have another look at Bulletin 111, where I noticed the reference to an Alldays and Onions inspection trolley.

"I think I probably originated the information about this vehicle (it is referred to in a Cape Archives file - I can't remember how the information got into circulation though - I may have informed David Rhind about it). The photo unearthed by Chris West poses rather a lot of questions. Firstly - where did Leith get the drawing from, because the drawing looks more like what I would expect a railcar to look like than the photo does. The reason I say this is that on the vehicle in the photo there does not appear to be an engine. Or if it was underneath the bench seat, while probably useful on a cold morning out in the Karroo, on a hot day it could easily become a case of (to quote a line from a very old Kenneth Horne show) 'there are flames licking round my joystick'. In other words, I suspect that the photo is of a non-powered trailer and

therefore not strictly a railcar. However, having said that I cannot really imagine that an 8 hp railcar would be able to cope with pulling a 9 seat trailer loaded probably with materials as well as people.

All in all maybe rather a conundrum, although the bottom line is probably that, while correspondence on a powered vehicle may exist, there is less chance that correspondence will refer to non-powered vehicles (not least because the powered vehicle would involve more maintenance, breakdowns, etc.)."

### Reply from Wally:

"I will put your email and comments, into Bulletin 113 as follow up. Briefly, there is no link between the two vehicles. The top vehicle must have had a motor as it has a crank handle. Leith's drawing was based on an old CGR drawing found in the basement of the Mechanical Engineer's Drawing Office, Salt River, before it closed."

#### To which Dave replied:

"I've been giving this matter some further thought. There are two major points. If it's a crank handle then where is the motor (and particularly the radiator, which protrudes well above seat level on Leiths drawing). The other is that the photograph appears to show wooden panelled ends to the vehicle - hardly helpful for the driver of a powered vehicle.

I even considered the possibility that they are actually the same vehicle; the photograph 'as delivered', the drawing after modification in the light of experience. However, the modification (including moving the engine) would probably be more than one could expect the CGR to be bothered to make (even if they had the expertise, which seems doubtful). I don't think that an underseat engine is at all a feasible proposition because petrol engines in those days were very temperamental beasts and the seat would regularly have to have come off for maintenance, and probably also for running repairs and adjustments (to magnetos, fuel/air intakes etc. - the petrol engine really was very different in those days from what we are used to now)."

Wally's reply:

"They are definitely not the same vehicle. Leith's drawing was of a vehicle supplied to the CGR. You unearthed this vehicle in you research into Railcars. The other vehicle was supplied to "South Africa" i.e. post 1910. I don't have any more info on this vehicle; I am forwarding Chris West's email, to which the photo was attached. I agree with your thoughts on early petrol engines, but I can't add anything further."



The full advert for the Alldays and Onions Railcar is shown above.

### Dave's final thoughts on the matter:

There are a couple of things here that need to be looked at carefully. The first is that in the SIA Bulletin the picture is from an advertisement for Alldays & Onions full stop - no mention of 'South Africa' - the connection with 'South Africa' has come from another source. Secondly, 'South Africa' was a generic term

used in the UK long before the Union came into being (as far as I can remember Percy Girouard's book is about 'the South African War' - it is a completely separate, though interesting, speculation as to when the term for this conflict consistently became 'Boer War').

To continue this thought, I would point out that SAR didn't indulge in any railcar development until the 1920s. Hendrie allowed existing projects (CSAR and possibly CGR-initiated) to be completed but there is no evidence that SAR followed this up or initiated anything at that stage. Of course it is debatable whether such things as motorised inspection cars would leave much of a 'paper trail' compared with 'proper' locomotives, but the sources I've seen suggest that the CGR had largely finished its experiments by 1910 and that the results didn't justify further expenditure of investigation (for reference, the only reference I have found to the Alldays & Onions inspection car is in file 2/1/133 in the CGR collection at the Cape Archives - a letter from the Chief Accountant to the General Manager dated 22 October 1908).

#### Have fun with this lot



One of the first motor jiggers introduced on the N.Z.R. The snap was taken at Mercer, about 1902, and shews (at back) Mr. C. Holm Biss, District Engineer, and front (left) Mr. H. Buxton, District Traffic Manager, and Mr. H. J. Jones, Stationmaster. Alldays and Onions inspection trolley, supplied to New Zealand, with engine beneath the seat.

## **ORENSTEIN & KOPPEL locomotives in South Africa before 1939**

### By John Middleton

Orenstein & Koppel was founded on April 1, 1876 in Berlin, by Benno Orenstein and Arthur Koppel as a general manufacturing company. Locomotive building started in 1892 in Berlin at the Märkische Lokomotivfabrik. As demand outstripped capacity, in 1899 a new works opened at Nowawes, later Babelsberg near Potsdam. Around 1908, O&K acquired the firm of Gerlach and König in Nordhausen, building petrol and diesel locomotives there under the trade mark "Montania". These were in a separate works number series which often causes confusion since there are two completely different O&K works number series both starting at 1 and running to many thousands. O&K's marketing was often done through local agencies under the Arthur Koppel name and many locomotives also carried Arthur Koppel plates. Arthur Koppel also marketed locomotives from other companies and the name Koppel became synonymous with light narrow gauge railways.

Quite a number of O&K locomotives were exported to South Africa (and neighbouring Countries) but unfortunately, surviving records are not too specific about quite a few and it remains a mystery as to where these worked. Hopefully this list will spur interest and possibly provide additional information from members. The best source of information is the list published by Jens Merte (<a href="http://www.merte.de/start.htm">http://www.merte.de/start.htm</a>). There are other lists, most notably the so called "Hutter" list but this is

known to contain many errors and so should be used with caution. The Merte lists show the following O&K locomotives as exported to South Africa, there may be others as the lists sometimes simply show "export" with no destination indicated. The lists below are as they appear in the Merte List with German text translated to English plus additional explanations.

Column 1 D = Dampf (steam), K = Kessel (Boiler), V = IC loco (Petrol / Diesel)

Column 2 Works number

Column 3 Year

Column 4 Power

Column 5 Bt = 0-4-0T; Ct = 0-6-0T; 2/3t = 0-4-2T; 1Bt = 2-4-0T; Dt = 0-8-0T; 3/4t = 0-6-2T B-bm = 4wPM, B-dm = 4wDM

Column 6 Gauge in mm 457 = 1'6"; 508 = 1'8"; 610 = 2'0"; 762 = 2'6"; 1067 = 3'6" (Note: 600 / 610 are used interchangeably in the lists

although 600 in metric form was not in common use in South Africa although it was in South West Africa and Mozambique, some

German owned mines did install 600 mm gauge lines)

Column 7 Ex Works Date

Column 8 Destination

Comments in italics are my additions

#### **OK - Berlin (Steam Locomotives)**

D	221 1897	20 HP	Bt	610	.09.1897	Transvaal, South Africa
D	381 c1899	30 HP	Bt	600	new	Transvaal, South Africa
D	440 c1899	30 HP	Bt	600	new	Gilbert, Hamer & Co. "ROODEPORT UNITED I"

Correct name was Roodepoort United Main Reef Gold Mining Co Ltd. Few details are known except the company was German owned (by the same Group that owned Princess (see 4645/4751) which explains the 600 mm (rather than 610 mm) gauge. Although the loco build date is c1899 its use may have been delayed by the Boer War as contemporary reports state that a steam tramway was installed in 1903. Presumably it was No. 1

D	694 1900	30 HP	Bt	610	.07.1900	Transvaal, South Africa
D	695 1900	30 HP	Bt	610	.07.1900	Transvaal, South Africa

Geldenhuis Deep Ltd near Germiston is known to have had at least 2 O&K 0-4-0T around this time and 694-695 are possibilities, by 1932 there were two steam locos working, but on a 1'6" gauge line one of which was a 30 HP O&K (see 1947 also).

D	696 1900	30 HP	Bt	610	.07.1900	Transvaal, South Africa
Delivered to	to Roodepoort	United Main Reef Gold	Mining Co Ltd (photo	o in Indu	strial Raily	vav Record 40 / page 161)

D	723 1900	50 HP	Bt	610	.08.1900	Stanger Veaumykl IngGes., Perm, for Export
D	724 1900	50 HP	Ct	610	.07.1900	Stanger Veaumykl IngGes., Perm, for Export

Delivered to the Stanger-Kearsney Light Railway later incorporated in the Huletts Sugar Estate.

D	909 1902	30 HP	Bt	610	.07.1902	Johannesburg, for export
D	1775 1906	50 HP	2/3t	610	.01.1906	South Western Railway Co., Transvaal

Although shown as "Transvaal" OK 1775 went to the South Western Railway, Knysna as their No. 1 and scrapped 1957

D	1947 1907	20 HP	Bt	457	.01.1907	Johannesburg, South Africa
D	2240 1907	100 HP	3/4t	610	.04.1907	South Western Railway, Australia

An example of how the lists need to be carefully read and interpreted, despite saying "Australia" the loco went to the South Western Railway at Knysna where it was No. 2, scrapped 1949.

D	2257 1907	250 HP	Ct	1067	.04.1907	Water Raud Cy, Johannesburg			
Correct	Correct name Rand Water Board where the loco was named ZWARTKOPPIES and was scrapped c1948								

D	2491 1908	30 HP	Bt	600	.03.1908	South Africa
D	2510 1907	40 HP	Bt	600	08 1907	J. I. Hulett & Sons Ltd. Cairo

2510 is a mysterious loco, why the O&K lists show "Cairo" is unknown although O&K did have a large agency there. The loco has a 1947 boiler plate in the Natal series which shows it likely worked for Huletts in Natal although we don't know at which estate. It was sold to the Luipaardsvlei Gold mine and in the 1960s was preserved at the Krugersdorp Safari Park, later moving to the L'Orient Express Restaurant in Halfway House. Today it survives and has been restored to working order at Sandstone Estates

3019 1909 140 PS 900 .10.1909 Peter Fix Söhne, Bauunternehmung, Meiderich (Germany) Loco rebuilt to 3'6" gauge and sold to Hollandske Aanneming Mij. in 1938 for use on the Table Bay Harbour expansion works as HNW 69, passed to SAR in 1940 and used as departmental shunter in Cape Town until 1956 at least. 600 .04.1909 Umhloti Valley Sugar Co. Ltd, Natal 3460 1909 30 HP Correct name Umhloti Valley Central Sugar Mill & Estate Co Ltd was taken over by Tongaat Sugar in 1922, OK 3460 was named "OK" and lasted until scrapped 1952. 3579 1909 610 .09.1909 Nigel Gold Mines & Co., Johannesburg Correct name Nigel Gold Mining Co Ltd. Little is known this operation but Nigel had a 2'0" gauge line with two steam locos (No.2 was also an 0-4-2T a JF (14608/15) which lasted until 1956) which was later electrified. D 3603 1909 600 .09.1909 Zwartkopien Coal Mines, South Africa 30 HP Correct name was Zwartkoppies Coal Mines Ltd which was at Palmer near Belfast. Nothing is known about the operation here which may have brought coal down to the SAR at Palmer (which is on the Steelpoort branch) 600 .10.1909 Luipaars Vlei, Estates & Gold Mining Co. Ltd, Johannesburg Correct name Luipaardsvlei Estates and Gold Mining Co Ltd, loco was their No. 3 and was reported derelict in 1966 later scrapped .07.1909 Ferraira Deep., Transvaal (Excavator Boiler) Not a loco but interesting that Ferreira Deep Ltd (correct name) were an OK customer. The mine had a 2'0" gauge line with AE steam locos and could be a possible destination for one of the early O&Ks 4015 1910 30 HP 508 .06.1910 Vallay Sugar Co. Ltd., Esperanza Natal There is no known sugar company in the Esperanza area with the name "Vallay" or "Valley", the gauge of 508 mm = 1'8" is the same as the original Reynolds Bros lines and it likely worked there. 4102 1910 50 HP 600 .07.1910 West Rand Consolidated, Transvaal Another survivor, preserved in working order at Sandstone Estates, It was sold by West Rand Consolidated to Vogelstrusibult Gold Mining Areas Ltd at Dunnottar in c1936 for mine construction work and ended up on the mines Childrens Railway named PUFFING BILLY, when the mine closed in 1968 it moved to West Driefontein Gold Mining Co Ltd at Carletonville for their childrens railway. In 1990 it moved to the Midmar Dam Railway and then to Sandstone. 4321 1910 30 HP 600 .11.1910 Transvaal Rt 4466 1911 50 HP 610 .01.1911 Clan Syndicate, Natal Bt Clan Syndicate Ltd operated a sawmill at Crammond on the SAR Dalton branch. There was a tram line from Karkloof to the mill but few details of its operation are known except that the loco reportedly ran-away and crashed into the mill at one point. 4645 1911 .04.1911 Princess Estate & G.M. Co. Ltd., Transvaal 4751 1911 .04.1911 Princes Estate & G.M. Co. Ltd., Transvaal D 30 HP Bt 600 Correct name was Princess Estate and Gold Mining Co Ltd which eventually became part of South Roodepoort (see 12892). Princess was German owned which explains the 600 mm gauge. No details of the operation are known. 150 HP 4880 1911 610 .07.1911 South Western Railways, Johannesburg South Western Railway, Knysna No. 3, scrapped 1949 D 5348 1912 50 HP 1Bt 610 .09.1912 Illovo Sugar Estates, Natal .04.1913 Illovo Sugar Estates, Natal 5830 1913 50 HP D 2/3t 610 Believed to be Illovo Nos 1 and 2, withdrawn c 1938, OK 5348 sold to Huletts, Darnall where it became No.11 scrapped 1960. 610 .04.1913 Ammonium Ltd., Natal Correct name Natal Ammonium Ltd which built a light railway from Boomlager to Enyati coal mine which closed in c1920 with the trackbed used for the 3'6" gauge Enyati Railway. 6955 1914 Ct 762 .02.1914 Sugar Factories Maxwell, Natal EWF Maxwell was the founder of St Lucia Sugar Co at Mtubatuba (later UCOSP), however the early locos are mysterious and contemporary reports suggest that equipment from Germany was not delivered due to WW 1. There is no evidence that O&K 6955 ever arrived in South Africa. 7122 1914 D Ct+t 610 .1914 Ammonium Ltd., Natal 7123 1914 D Ct 610 .1914 Ammonium Ltd., Natal 7126 1914 Ct 610 .1914 Ammonium Ltd., Natal See 6142. Of these 4 locos 7122 sold to Lonely Gold Mine, Rhodesia, then Selukwe Peak Railway and today preserved in the UK. 1 or 2 of the others thought to have been sold to Rustenburg Platinum Mine (see 12959) 7167 c1914 610 new Reynolds Brothers Ltd., Natal May have later been sold to Crookes Bros, Renishaw which had an unidentified O&K 0-6-0T. 610 7522 1914 30 HP new Zululand Sugar Milling Co. Correct name Zululand Sugar Millers & Planters Ltd, Empangeni, loco was still here in 1940.

new South Western Railway, Johannesburg

Κ

7645 1923

Replacement boiler for O&K 4880

9439 1926 610 neu Hunt, Leuchars & Hepburn, Durban See also 11259. Line at Windy Hill Wattle Co Ltd, Wartburg, Natal had two locos secondhand from Hunt Leuchars & Hepburn during 1922 (not identified but possibly from a line at Blinkwater Forest Co which had a line at New Hannover. 9439 ordered to replace these locos but lost at sea in sinking of SS Cawdor off West Africa. Replacement was O&K 11259. 10085 1926 08.1926 South Western Railway Co., Johannesburg Replacement boiler 11010 1925 Ct 762 new South Africa The only 2'6" gauge lines in South Africa were the Namaqualand Railway, Sub Nigel and UCOSP at Mtubatuba, this loco has not been reported and may not have been for South Africa 457 new Messina Development, Johannesburg Correct name Messina Transvaal Development Co Ltd, Messina Copper Mines, the railway was electrified in 1939 and the loco was preserved in Messina in 1956 and survives today. Messina opened in 1904 and there may have been an older loco (eg: O&K 1947?) D 11175 1926 Bt 610 new E.W. Hawksworth & Sons, Durban, South Africa See 11322 11259 1926 Ct 610 new Hunt Leuchars & Hepburn, for Windy Hill Wattle Co., Durban Replacement for O&K 9439 (lost at sea). Sold To Huletts, Darnall in 1945. 508 new H.W. Hawksworth & Sons Correct name E W Hawkesworth & Sons Ltd, Beneva Sugar Estate which was taken over by Reynolds Bros in 1930. Hawkesworth operated both 1'8" and 2'0" gauge lines 12172 1930 Ct 457 new The Messina Development Co., South Africa As for 11092, loco was scrapped in 1951 12331 1931 762 new The Sub Nigel Ltd., South Africa Loco preserved by Puffing Billy Railway, Victoria, Australia 12420 1933 new Zululand Sugar Milas & Plantas, South Africa Replacement Boiler (presumably for 7522). Correct name Zululand Sugar Millers & Planters Ltd D 12689 1935 Rt 610 new New Mechanic Gold Mining, South Africa 12691 1936 610 new New Mechanie Gold Mining, South Africa Bt Correct name is New Machavie Gold Mining Co Ltd, Buffelsdoom Mine. Closed 1945, 12691 sold to Dominion Reefs Ltd, Klerksdorp and later preserved by Dunns Engineering in Witbank, then SANRASM Krugersdorp and today at Sandstone Estates. 12857 1936 610 new Kolce Sisal Estate, South Africa Ct Cannot trace Kolce - could be Mozambique, Tanzania or Kenya 12892 1936 475 D Rt new South Roodeport Main Reef Areas, Johannesburg Track gauge was 1'6" (457 mm) 12959 1937 new The Rustenbay Platinum Mines, Johannesburg Replacement Boiler, correct name Rustenburg Platinum Mines Ltd, thought to be for one of the former Natal Ammonium locos (see 6142, 7122/23/26) of which two likely came to RPM 12993 1937 60 HP Bt 600 new New Mechavie Gold Mining Co., South Africa See 12689/12691 OK-Nordhausen (formerly Montania) Petrol and Diesel Locos 1911 50 HP B-bm .04.1911 John Birch & Co., London [GB], for Natal Presumably for a sugar estate 1924 S-30 0-6-0PM 610 1924 SAR, Table Bay Harbour Construction Contracts 1924 S-30 0-6-0PM 610 1924 SAR, Table Bay Harbour Construction Contracts

One S30 (likely one of these two) rebuilt by United Loco & Wagon, Johannesburg in 1954 as SAR Departmental Loco K10882

V	2299 1926	M	B-bm	610 09.08.192	6 Stock, Durban
V	4519 1931	RL 1 a	B-dm	610 20.07.193	1 Stock, Durban
V	4988 1933	RL 1 a	B-dm	610 07.06.193	3 O&K Durban, for Pretoria Portland Cement Co., Johannesburg
V	5132 1933	LD 2	B-dm	600 18.10.193	3 Pretoria Portland Cement Co., Johannesburg
Which	PPC works has n	ot been identified			
V	6275 1935	LD 2	B-dm	20.09.193	5 Johannesburg, for Stock Durban
V	6401 1935	LD 2	B-dm	610 15.11.193	5 O&K Johannesburg, for Durban
V	6416 1935	LD 2	B-dm	600 15.12.193	5 O&K Johannesburg, for Durban
V	8009 1937	MD 1	B-dm	600 26.08.193	7 O&K SA Ltd., Johannesburg, for Durban
V	8534 1937	MD 1	B-dm	610 21.12.193	7 Johannesburg
V	8617 1938	MD 2	B-dm	610 22.02.193	8 O&K Johannesburg, for S.A.R., South Africa
V	8618 1938	MD 2	B-dm	610 22.02.193	8 O&K Johannesburg, for S.A.R., South Africa
A phot	to exists of an MD	2 (presumably one of t	these) in use on tunn	nel construction at	Dohne (Cape Eastern Main line re-alignment) in 1939
V	8882 1938	RL1c	B-dm	610 18.03.193	8 O&K Johannesburg, for Hollandsche Aanneming Mij.
Presui	mably for Table Ba	ay Harbour Constructio	on contracts		
V	9060 1938	MD 1	B-dm	610 14.07.193	8 Johannesburg
V	9085 1938	LD 2	B-dm	610 17.05.193	8 CFLM Stock Durban
V	9086 1938	LD 2	B-dm	610 17.05.193	8 CFLM Stock Durban
Possik	bly CFLM may ind	icate these locos were	for Mozambique		
V	9129 1938	MD 1	B-dm	610 11.06.193	8 Johannesburg, for Durban
V	9423 1938	MD 1	B-dm	457 23.08.193	8 Johannesburg
V	9981 1939	MD 1	B-dm	610 07.03.193	9 South African Union
V	10568 1939	MD 1	B-dm	610 07.06.193	9 Durban Maydon Wharf, South Africa
V	10828 1939	MD 1	B-dm	610 09.08.193	9 Durban Maydon Wharf, South Africa
OK-Be	erlin Diesel Loco	motives:			
V	20367 1933	RL 3	B-dm	600 14.08.193	3 Goldmines/South Africa
V	20389 1933	RL3	B-dm	600 04.10.193	3 Goldmines/South Africa

20674 1936

20760 1936

٧

RL3

RL3

B-dm

B-dm

610 15.02.1936 Johannesburg/South Africa

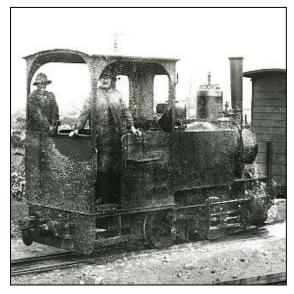
600 06.06.1936 South African Union/South Africa

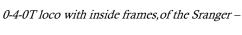
٧	20818 1936	RL3	B-dm	600	03.09.1936	Johannesburg/South Africa
٧	20998 1937	2D	B-dm	457/610	13.06.1937	O&K, Durban, for South African Union
٧	21011 1938	MD 3	B-dm	457/610	.01.1938	O&K SA Ltd., Johannesburg-Durban/South Africa
٧	21175 1938	RL 3	B-dm	610	29.04.1938	South African Union, Johannesburg/South Africa
٧	21176 1938	RL 3	B-dm	610	29.04.1938	South African Union, Johannesburg/South Africa
٧	21247 1939	2D	B-dm	457/610	29.09.1939	Johannesburg/South Africa

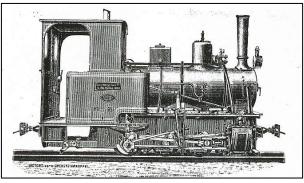
No customers identified for any of above

Two unidentified 2'0" gauge O&K diesels were derelict at Doomkop Sugar Co (Pty) Ltd in 1965, one reported as 4wDM and one as 6wDM.

This article was written following the discovery of an O & K Catalogue, dated 1900, in the Cape Archives.





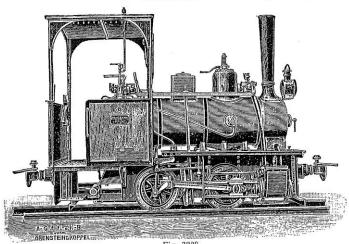


Catalogue illustration of an 0-6-0 with outside frames, for the Stanger Kearsney Light Railway.



O & K No. 2510 built for J L Hulett & Sons, now Restored at Sandstone Estates.

# 3. Standard Designes of Locomotive.



# a) Four-Wheel Coupled Locomolives.

Fig. 3228 illustrates our standard design of locomotives. This engine has four-wheels coupled.

# b) Six-Wheel Coupled Locomotives.

Fig. 3229 represents a locomotive which is particularly suitable for performing long runs and operating on light rails with a reduced number of sleepers. This engine is very easy on the track, as the weight is distributed over six wheels.

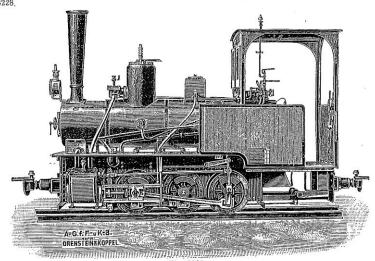


Fig. 3229.

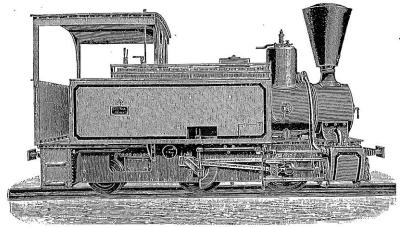


Fig. 3230.

# c) Four-Wheel Coupled Locomotive with Two-Wheel Frailing Bogie.

These engines claim the advantage of being able to pass round sharp curves and to operate on light tracks. They are particularly designed to cover long distances with no watering or fuel stations, astheyhavelarge bunkers and tanks.

Three illustrations from the 1900 catalogue for O & K.