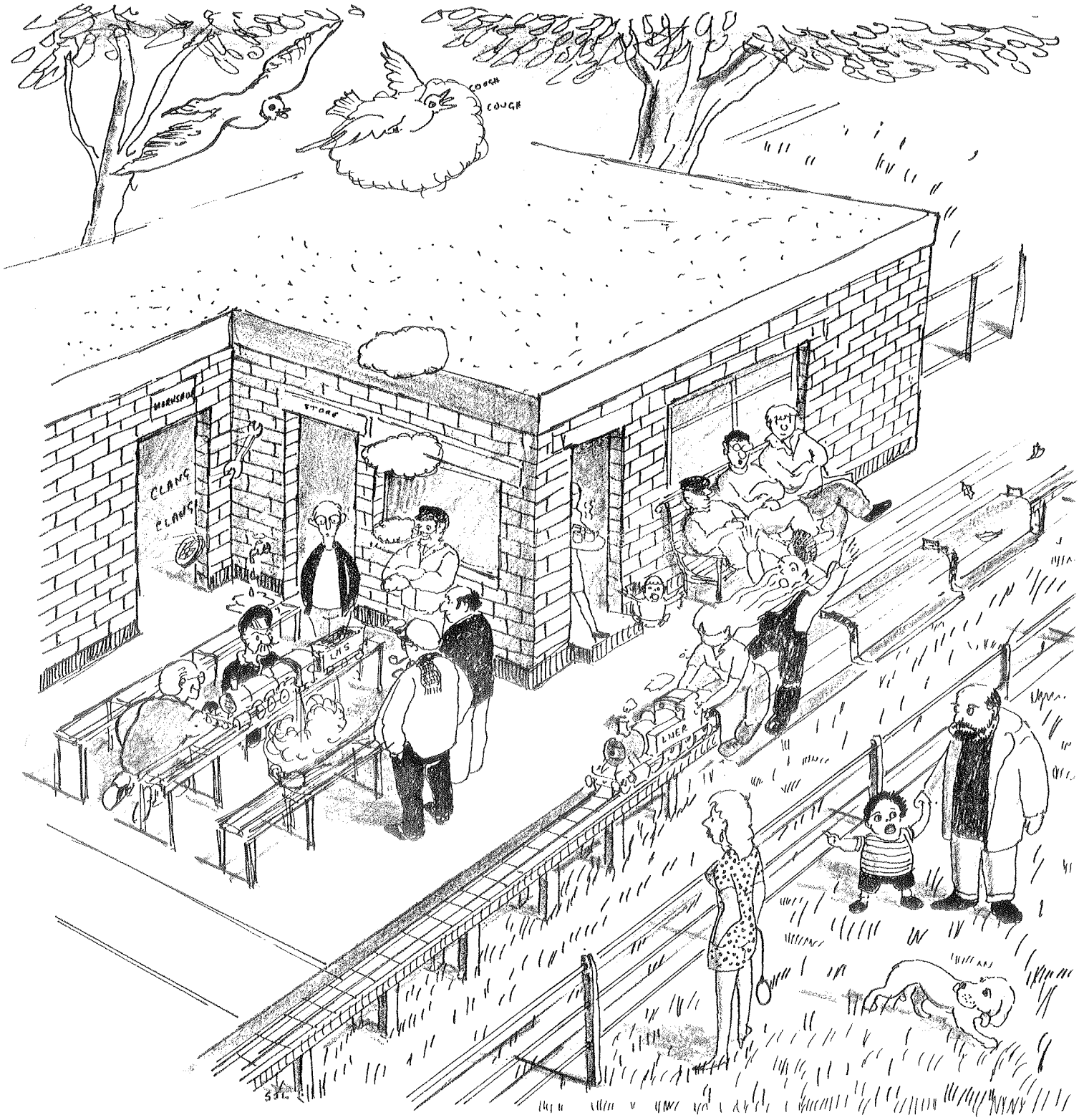
Maidstone Model Engineering Society.



NEWSLETTER - SPRING 1987.

My thanks to Sam Ludford for the cover of this newsletter which pictures a typical scene at Mote Park on a Sunday.It looks suspiciously like me zooming through the station on Adrian's freshly completed Enterprise and I'm sure you may recognise one or two other characters as well!More from me later on,
Sue.

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CHAIRMAN'S REPORT 1987

1986 has been another year of financial stability for our Club in spite of the poor summer weather.The few Sundays that were fine we managed to cope with the usual crowds that congregate as soon as a wisp of steam appears.

This was in a large part due to Norman Clark's new "Monster" driven by his Chief Engineer, Paul.I hope for the coming season to put in a few more appearances myself,and rumour has it that we may see at least one new addition to the available Locomotive Roster soon!

The Club Loco' is now beginning to look more like something that runs on rails instead of something that spans a river, although having transported it in the boot of my car it seems to be the same weight as a bit of Civil Engineering.Still we won't get wheel slip!

You will notice that we have spent some of our hard earned revenue on improving our creature comforts in the Clubhouse - we should all now have something to sit on for the A.G.M. and Club Night events.The kitchen area has been re-arranged and some new cabinets installed under the supervision of the Catering Department.

We still seem to be getting a steady flow of new members each year, mainly in the older age group, I think we must try to encourage more youngsters into our hobby. This is not easy with the expense of setting up a workshop but most of us older "Dinosaurs" managed with very little equipment in our early days and it must be remembered that Locomotives and Traction Engines are not the only things that qualify you to the title "Model Engineer". I have in the past modelled Aircraft, Cars, Clocks, Boats, Aero Engines, Weapons - in fact anything which took my fancy at the time.None of the projects mentioned takes the time or the equipment of steam powered vehicles so any of you members high on enthusiasm but low on equipment - why not have a go, I for one would be pleased to see some more varied models turning up for members to gaze at in awe or wonderment.

Finally, if 1987 is to be another successful year it means all of us have to work at being active members of the Club and not backward at coming forward when something needs doing.

Graham Kimber

March 1987.

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CLUB NIGHT MEETINGS

Please note that for the benefit of the majority of members and guest speakers there is to be NO SMOKING in the Clubhouse on Club Nights.Thank you.

SOME MORE INTERESTING LOGOMOTIVES -
by Andy Probyn.

Last time I wrote about some unusual locomotives, which appeared in an old encyclopaedia of the early 1860's. Here are a few more items from the book which should be of interest to railway enthusiasts. We begin with the water scoop for tender filling, the description of which is as follows: "By an invention of Mr Ramsbottom, the tender of a locomotive is made to suply itself with water while in motion, through a tubular pipe which dips into a [illegible]g water trough lying between the rails. The speed should be at least 22 miles per hour to enable the apparatus to work." One tends to associate water pickup apparatus in tenders with modern locos, but as you can see it goes back a long way. Travelling in the first class coach behind a tender picking up water could be quite an experiance, like being in a heavy rain storm coming up from below rather than [illegible]wn from above. The water scoop certainly helped to keep tenders small on British locomotives when compared with their counterparts abroad and must have come as a boon to some loco designers where a new longer locomotive could not easily be fitted on existing turntables. Among the big companies, the London & South Western did not use water troughs and was one of the first with eight wheel tenders (see the York museum's T9.loco on the Mid Hants Railway).

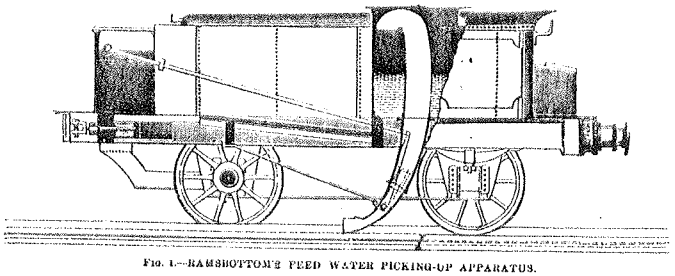


Fig. 1.—RAMSBOTTOM'S FEED WATER PICKING-UP APPARATUS.

Next on the agenda comes a normal looking goods engine, normal that is until you see the grate. The description runs as follows: "Fig.2 represents a coal burning heavy goods engine, made for the London, Chatham, and Dover Railway by Messrs. Sharp, Stuart, and Company. The wheels are 5 feet in diameter; the wheelbase is 15 1/2 feet; the cylinders are inside, of 17 inches diameter and 24 inches stroke; the area of the firegrate is unusually large, being 27 1/2 square feet, the firebox surface is also large being 120 1/2 square feet; the tube surface is 1063 square feet; the boiler is fed by a pair of Giffards injectors, without pumps. The weight of the engine is when empty 28 tons 11 1/2 c.w.t., when full 32 tons 1 c.w.t. The coal burning arrangement is Mr Cudworths. The grate is very long, measuring 7 feet 3 1/4 inches in length; it slopes downward from the door towards the front, and is divided longditudonally by a partition or 'mid-feather'; and smoke is prevented by alternate firing, and by letting the gas distil from the coal near the door before pushing the fuel forward."

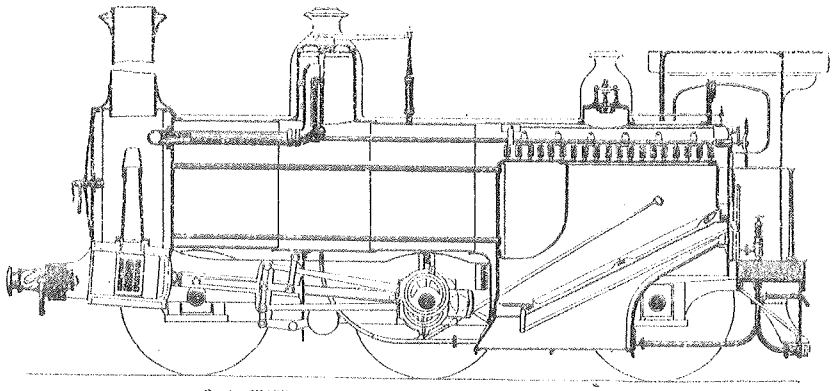
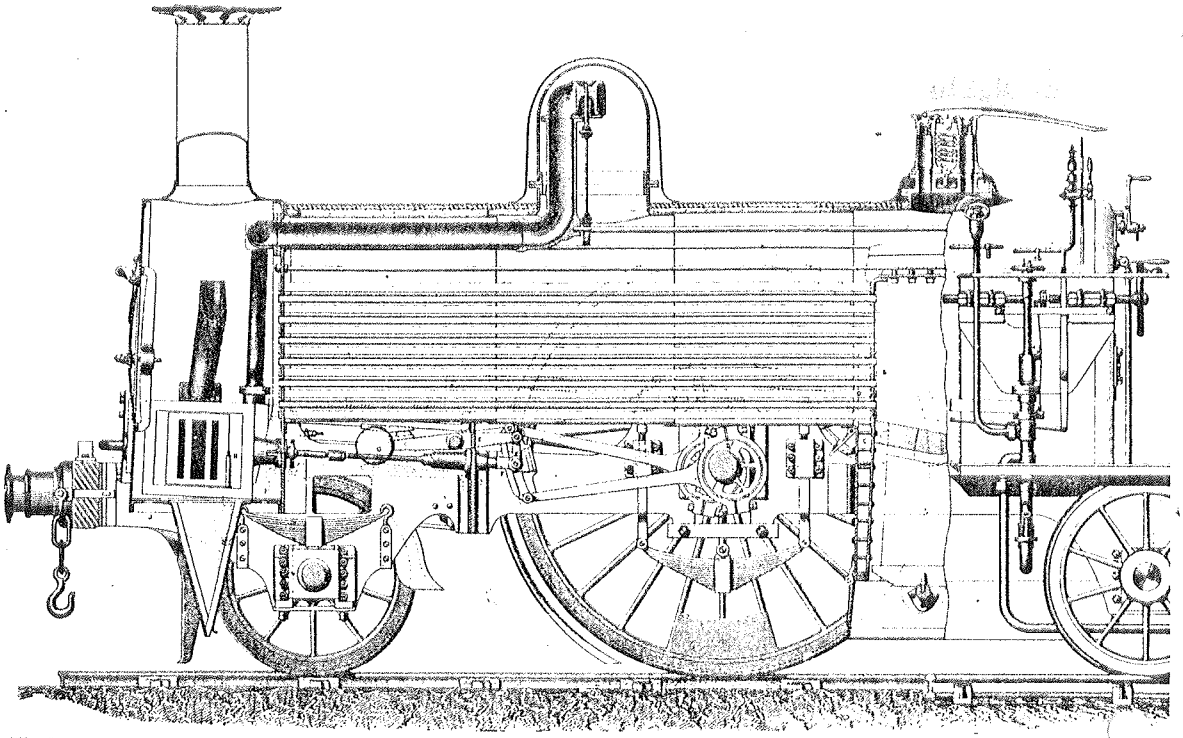
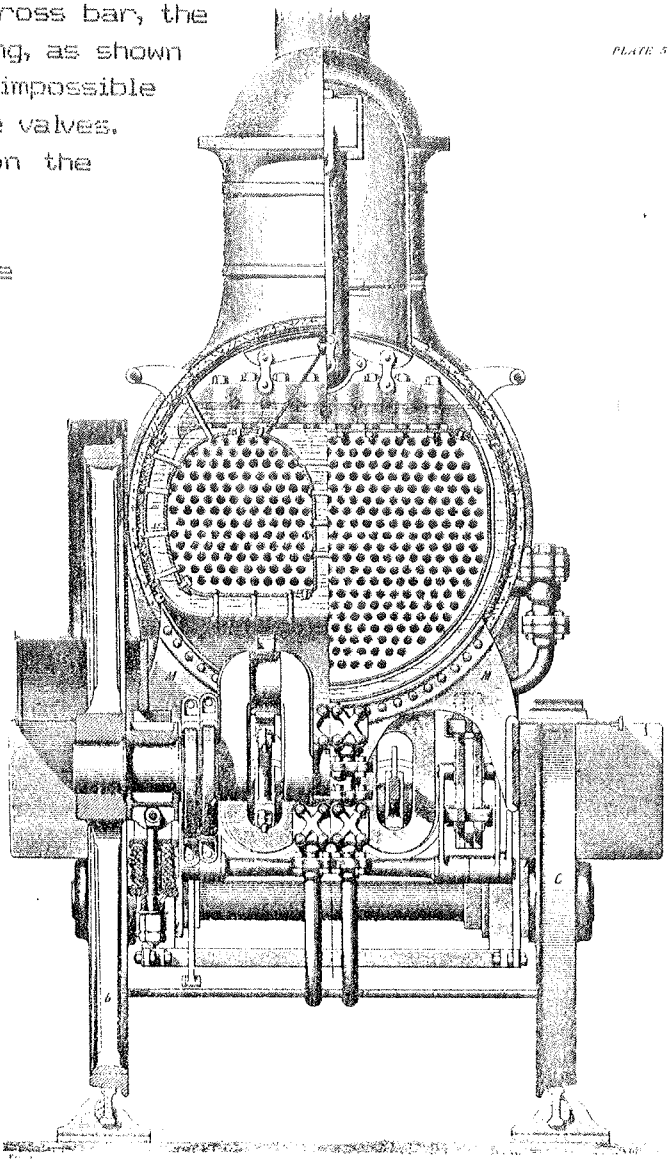


Fig. 2.—SHARP, STEWART, & CO.'S LOCOMOTIVE—LONGITUDINAL SECTION.

I know early locomotives used coke as fuel but I had thought that coal was the norm by the 1860's. Judging by the above discription, coal was still proving a problem and this sort of grate must have been one method. A brick arch in the firebox was the eventual answer and stayed with us to the end of steam though I must say I like the idea of pushing the coal down the grate as it burns and out at the bottom rather like a chain grate in a power station.



The description of the last two plates goes as follows: "Plate 4 is a longditudinal section, and plate 5 a transverse section of an engine by John Ramsbottom, Esq., being one out of a great number of similar engines now used on the London and North Western Railway. The driving wheels are 7 feet 7 1/2 inches in diameter, the wheelbase is 15 feet 5 inches; the cylinders are outside, and are 16 inches in diameter by 24 inches stoke; the area of the fire grate is 14?5 square feet; of firebox heating surface' 85 square feet; of external tube surface 1013 square feet. The boiler is fed without pumps by two Giffards injectors, and is fitted with Mr Ramsbottoms duplex safety valve, in which a pair of valves are pressed down by two ends of a cross bar, the middle of which is held down by means of a spring, as shown in the plate, an arrangement which makes it impossible for the engine driver to increase the load on the valves. The ordinary working pressure is 120 pounds on the square inch."



All the above is highly commendable but as anyone who has inspected the two elevations will see they are not both of the same locomotive! The side elevation is the loco described while the end elevation is of a loco with inside cylinders, not outside, a different dome and equipped with what looks suspiciously like pumps rather than 'Giffords injectors'. Just to add to the interest, this locomotive in the end elevation has a most peculiar boiler. The base of the barrel is raised to clear the cranks, and there are two combustion chambers to carry the gasses through the narrow section of the boiler. In front of this is a single large combustion chamber where the tubes themselves start. This chamber is equipped with a most substantial looking girder roof stay which would grace any firebox. Unfortunately, there is no further information on this most interesting locomotive. The next instalment will deal with a flexible 0-10-0 of the same vintage.

DO FOR FIVE BOB

By Lionel Alexander

No one says "no" to Sue - except possibly, and very rarely, Adrian. The last time I was at the Park, Sue invited me to write something for the newsletter, and I treated it as if it was a Royal command. But what to write about? Model engineering, of course. Now as a lawyer I am fussy about the English language to the point of pedantry, and I don't think I can call myself an engineer at all. But aren't we all engineers? The name of our hobby says so. I have grave doubts. An engineer is a person who *designs things*. We have lots of those. Ray and Graham (to name but two) tend to look at a prototype, or even photographs of a long-extinct prototype, and then design a realization in miniature. Even if the original outline is adhered to, and maybe the machinery as well, this realisation involves a whole range of engineering design over and above direct scaling. Jim is also an engineer, but somtimes in a different way. His habit is to take a miniature, which may or may not be a model of a prototype, and then address himself to fundamental aspects of design, such as thermodynamics, as well as to more mundane matters such as the design of components. I don't do anything like that. The only thing I ever remember designing was the mechanical pump for the steam launch *Margaret Morrison*. The fact that in the end it looked exactly like one of LBSC's originals makes no difference. The point is that I had to consider rates of delivery (even I can work out the volume of a cylinder) and look up in the reference books appropiate ball lifts to suit the balls being used. Nothing wrong with that. My late father-in-law, who was a consulting engineer of quality, never put pencil to paper without first consulting his reference books.

In the ordinary way, however, I design nothing, as in the case with many of my fellow-hobbyists. When it comes to locomotives, I tend to begin by writing a specification. For example, it will be 3 1/2" gauge, because I am getting older and feebler, It is time I built a 4-4-0. And so on. Then I look to see what published designs are available, and I buy a set of drawings for my provisional choice. If I like the drawings, I raid the piggy bank for a set of castings. If my youngest daughter happens to want to fly me to the Isle of Wight to collect them, so much the better. From then on, it's a matter of reading the drawings and doing as the designer intended - more or less.

If I'm not an engineer, then what am I? A multi-discipline craftsman, I think. Lots and lots of multi. Draughtsman, sheet metal worker, turner, coppersmith, tool maker. These are just some of the skills involved. Tool maker? Yes, indeed. Just knowing how to sharpen a lathe tool is toolmaking, let alone making little things like D-bits. This is true of all model engineers, even those who limit themselves to servicing second hand locomotives that they have bought or assembling bolt-together kits. As to the latter, my observation is that the assembler has at least to be an atrist with a spanner, which makes him a mechanic. I have however a shrewd suspicion, seeing some of these kits, that he has to be an artist with a file as well, which makes him a fitter.

So, if not an engineer, what qualification have I for writing about model engineering? Inspiration came to me, oddly enough, from my current rear buffer beam. This called for 1 1/4" x 1/8" (or 3mm) square root and corner angle. I rootled about, not very hopefully, in the ever-expanding junk box, and came upon some extremely rusty bed angle, 2 x 2 x 1/8 nominal. 3mm is .007 under 1/8. That gave me an allowance to get below the rust. The corner turned out to be square, although as is usual in bed angle, the root was radiused. No matter. Much sawing, filing and milling having ensued, there was a rear buffer beam to drawing. Cost, nil except my time. But we never consider time, do we? Otherwise, we would be playing the stock-exchange instead of making miniatures, and we might be richer if less content. This experience led me to reflect that I do this sort of thing all the time. Not so long ago, for instance, I made a small 4-stroke aero engine. The design called for EN8 steel for the cylinders. Naturally, they started life as offcuts from SUPACAT axles. What is Supacat? I'll save it for another day. In fact (still on this engine) the bought-out parts were confined to gears (sorry about that, but they were very small gears and easy to buy); glow-plugs and a ball race. Some of the raw material came out of that arch-squirrel Graham's scrap box, for which many thanks. Perhaps my best effort was the *Margaret Morrison's* smokebox, which is still just recognizable as a Mini rear brake drum.

I quote my own experiences solely in order to make the point that they are just like yours. To almost all of us, in the infinite variety of our skills and ambitions in model making, half, or more than half the fun is realizing that any old iron has locked up in it the shape we want. When we get it right, we have liberated the waiting part from the metal. Michaelangelo was the inventor of this concept (applied to marble, of course) and he may fairly be said to have known what he was about.

But it occurs to me that this liberation has a more mundane result. *It saves money*. And that leads me to the conclusion that all of us, including me, are engineers after all, since you all know that

an engineer is a guy who can do for five bob what any fool can do for a quid.

I end by changing the subject. At the time of writing, the climate in Invernesshire is a vast improvement on Kent. Come, one and all, and see for yourselves.

4/2/87.

1987 TRAFFIC CONTROLLER ROSTER

April	19th	J.Payne
	20th	G.Riddles
	26th	P.Chislett
May	3rd	N.Clark
	4th	R.Spencer
	10th	D.Paterson
	17th	A.Gurr
	24th	R.Vane
	25th	P.Martin
	31st	P.Jackson
June	7th	T.Friskin
	14th	G.Evans
	21st	R.Crane
	28th	K.Linkins
July	5th	N.King
	12th	C.Neill
	19th	S.Ludford
	26th	R.Chessman
August	2nd	S.Cox
	9th	S.Parkes
	16th	A.Probyn
	23rd	J.Rice
	30th	D.Osbaldstone
	31st	L.Hulbert
September	6th	P.Kingsford
	13th	E.Knott
	20th	M.Knott
	27th	R.Linkins
October	4th	P.Neilson
	11th	N.Nicholls
	18th	A.Tate

Please do your duty on your allocated day.If you cannot attend on that day please let Chris Williams know so that alternate arrangements can be made.Thank You

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DIARY DATES

Sunday April 19th	:First Public Running Day
Friday May 1st	:Tim Keenan talks on Richborough Port,Manston Camp & the Royal Naval Air Station 1914-1918
Saturday May 16th	:Southern Federation Rally at Sheppey
Saturday May 23rd	:Sutton Club visit to Mote Park
Friday June 5th	:Evening run & Fish'n'chip night
Saturday June 20th	:OPEN DAY M.M.E.S.
Friday July 3rd	:Evening run & Fancy Dress
Friday August 7th	:Evening run & Barbecue
Friday Sept 4th	:To be arranged
Friday Oct 2nd	:To be arranged
Sunday Oct 25th	:Last Public Running Day

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Closing date for articles for the next newsletter is Sunday August 9th,EARLIER IF POSSIBLE.

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NEW,NEW MEMBERS!

Congratulations to Richard & Dorothy Linkins on the arrival of their first son John,at the beginning of March.

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MAIDSTONE MODEL ENGINEERING SOCIETY OFFICERS 1987

President	*A.H.W. Payne Esq (Jack),38 Oxford Road,Maidstone,Kent.ME15 8DJ. Maidstone 57545.*
Chairman	*G.Kimber Esq (Graham),4 The Stream,Ditton,Maidstone,Kent. West Malling 845931.*
Vice Chairman	*P.J.A. Chislett Esq. (Peter), 30 Manor Rise, Bearsted,Maidstone,Kent. ME14 4DB. Maidstone 37407.*
Secretary	*M.N. Farham Esq. (Martin),Bramleys,Old Loose Hill, Loose,Maidstone,Kent.ME15 0BS. Maidstone 44175.*
Treasurer	*P.A.Roots Esq. (Pete),97 Tonbridge Road, Maidstone,Kent.ME16 8JN. Maidstone 58599.*
Press Officer	*Mrs S.Gurr (Sue),28 Claremont Road,Vinters Park Estate,Maidstone, Kent.ME14 5LZ. Maidstone 678903.*

Committee

Norman Clark, Adrian Gurr, Don Paterson,Geoff Riddles,Robin Spencer and Chris Williams.

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NEW MEMBERS

Please welcome to the society:

Stephen Parkes *from Chatham who is shortly starting a Simplex; and*
Stephen Wallin *from Tonbridge who is interested in marine models and live steam and is building a Tich.*

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HAVE YOU PAID YOUR SUBSCRIPTION YET?

If not it is now overdue and this is your final reminder.
Unless the Treasurer receives your monies within the next month ***this will be the last communication you will receive from the society****. Chasing subs is time consuming and costly. Please tear off the slip below and send to Peter Roots as soon as possible.*

I enclose herewith the sum of £..........(£5 per person or £2-50 for retired members) which is my subscription to Maidstone Model Engineering Society for 1987.

....
name *date*
address..
....

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ONE LUMP OR TWO?

The second of January 1963 and at 5.30 pm a Brittania of British Overseas Airways touches down at Seawell Airport, Barbados after its three day daylight only journey from London. Twelve passengers alight, only one will stay and eleven will continue the following day to the final destination of Lima in Peru.

The fifth of May 1985 and at 5.45 pm a Boeing 747 of British Airways touches down at Grantley Adams Airport, Barbados at the end of its eight and a half hour non stop flight from London. Three hundred and eighty six passengers alight to stay, including the one of 1963, for the final stage of an engineering saga that commenced 23 years earlier.

As a young recently qualified engineer I had volunteered to join the newly formed overseas division of the building and civil engineering contractors with whom I was employed. The firm, a subsidiary in the Charles Clore empire, was negotiating to design and build the Barbados Hilton Hotel for the Government and as part of this had agreed to arrange the rebuilding of Porters Sugar factory which had been partly destroyed in the hurricane of 1961. Local attempts to engineer an effective repair and rebuild had failed.

Porters factory was originally built in 1827 and extended many times before the disaster of 1961. In the 1960s sugar formed the principal export of Barbados, tourism being virtually unknown except for the cricket season. The loss of the Island's largest factory seriously affected the Island's ability to process its sugar cane within the season and great importance was attached to its recovery.

Sugar is not indigenous to the West Indies, Dutch settlers had brought sugar cane from the East Indies to South America in the early 18th century and relatives of these settlers spread east to the islands of Trinidad and Barbados by 1750. Barbados at this time was covered with dense foliage of mahogany and bearded fig the name for which, in the Carrib Indian language, is Barbadus, (Barbados). Coconut palms generally grow only on the coastal inlets in the highly fertile black soils which overlay the coral that forms the basis of the islands's sub soil. By the end of the 18th century almost 50% of the land area was covered by sugar cane.

Cane is a relative of bamboo growing to a height of 8 ft - 9 ft in sticks of around 1½" diameter, greeny yellow in colour. The sugar is contained beneath the skin in a hollow stick with the consistency of balsa wood. The cane can be peeled and the sugar sucked out.

Originally the cane was cut between January and July, bundled and sent by sailing ship to Bristol, where it was milled to sugar, set in moulds and sold wrapped in blue paper. Sugar cane however, contains only 1½% of sugar by weight and at the end of the 18th century technology could only extract 50% of that. Accordingly ships were bringing 99% of waste some 6,000 miles.

The first sugar mill arrived in Barbados in 1804 and consisted of what was in effect a huge mangle but with serrated steel rollers to crush the cane and squeeze out the juice. The power for this was provided by windmills and the original, at Morgan Lewis on the highest point of the island, still exists today. By 1825 more than 300 wind powered mills were in operation throughout the island, processing some 150,000 tons of raw sugar all of which was sent to England as sugar loaf.

Some time around 1820 construction of Porters factory began with the erection of a vast hall supported on 60 ft high mahogany trunks with a roof of lattice work. Local history suggests that the original lattice work was bamboo but that part which still existed in 1963 was of iron. Within, were installed it appears, around twelve individual crushing mills and four distilling pots. The mills were driven by a large beam engine set outside and the steam for this was provided by two haystack boilers fed from bagasse, the waste of cane left after sugar extraction. Few records exist as to the progress of Porters factory until its eventual demise in 1985.

The process of the manufacture of sugar from cane is one that after having been involved in it, you tend to avoid sugar thereafter.

Cane is cut now as it always has been, by hand, in a country where 60% unemployment is considered good. Cane cutting employs most of the male population for around a quarter of the year. Cane does not require replanting and like the garden weed it keeps coming back, but with the advent of modern ploughing and harrowing some replanting is effected to maintain the rows to enable tractors to collect the cut sticks. In 1963 all the cane was carried by men to the nearest roadway where it was loaded onto donkey carts or the occasional ex World War II Bedford truck. First cutting of mature cane starts in January and cart and lorry loads begin to appear in proliferation at the factories where huge stock piles are formed. What I shall describe is the process as it was at Porters factory in 1963 through to 1985 and with the exception of the means of transport, remains so today. I have not been involved in sugar outside of the West Indies but I believe that there is little difference wherever manufacture takes place.

Steam power was provided by four large boilers, manufactured between 1916 and 1920 by Babcock and Wilcox in Glasgow. They sit side by side in the same general position of the original haystack boilers. In 1963 one of the haystacks was still on site and with no scrapyards (bad place for G Kimber) it was hauled just under a mile to the beach and sunk in about 50 ft of water off the now world famous Sandy Lane Hotel. Unfortunately the barge we used as transport sank as well! As some good always comes from bad these have accumulated a large ingress of fish and the "sunken wreck" has now become a standard snorkel and mask visit for tourists. Go to Barbados, see a genuine haystack boiler!

Once the factory is underway then the boilers are kept in action for around four months by fuelling with the bagasse a beige mass of damp 8" long fibres which burn with great ferocity, belching dark grey smoke and light grey debris all around with the sickly sweet smell of burnt treacle.

On a concrete and stone platform above the furnaces stand four men, one to each boiler. Each has two long handles similar to those for old overhead belt operated machinery, a shovel and a broom. One handle controls the steam valve to the double acting boiler feed pumps, the use of which is determined by a single water gauge in front of the man. The other operates a plough to skim off bagasse from the conveyor overhead, taking waste out to the stock pile. A pressure gauge on the boiler face shows the need for more bagasse which drops all around and is shovelled and brushed down a 15" hole in the floor through which a person can easily fall and it is said that several have. The hole is covered with a loose plate about $\frac{3}{4}$" thick but I have never ever seen it laid over. With the external shade temperature approaching 100^{o} F at this time of year the boiler room temperature needs to be felt to be appreciated, despite the fact that there are only "walls" on two sides.

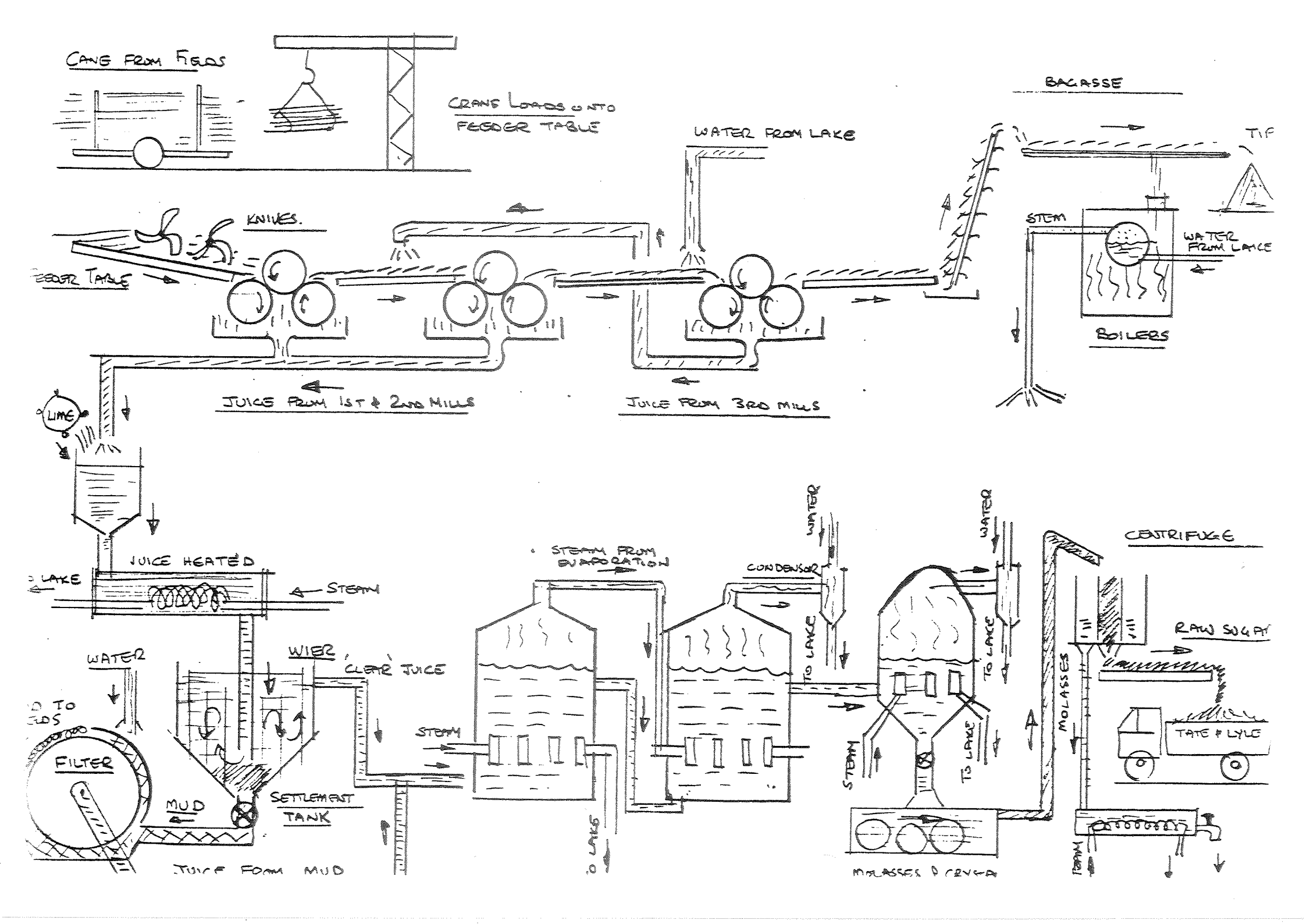
From the boilers a maze of pipework built up over the years would do credit to Monty Python, transmitting high and low pressure steam to all points of the factory. Exhaust gases pass along an iron flue between the molasses tanks to keep these hot and depart up a coral stone chimney to pollute the atmosphere.

A steam operated, hammer head crane manufactured by Stotherts in 1912 gives coverage to much of the stockyard where the piles of cane between 6 ft and 8 ft long, together with large quantities of earth, mud, leaves, vermin (and the occasional machete amputated limb) rise to 30 ft - 40 ft high. A grab on the crane picks up around 2 cubic yards of cane at a time, dropping it into a receiving bin above a continuous chain conveyor, which draws it into the factory proper. At the factory wall is the first stage of production, where the cane falls from the conveyor into the rotating knives of the cutting wheels and the mass is reduced to approximaely 8" lengths. The broken cane then feeds into the "first mill", usually consisting of two sets of three serrated rollers one above two, running in a bath of boiling sugar juice. This juice has the look of the washing up water after 2,000 saucepans and smells as bad!! Continuous wooden slat conveyors pick up the cane and pass it to the next mill, the serrations and clearances between successive mills becoming less. A chain conveyor beneath the rollers picks up cane that falls through, dropping this into a catch pit where it is dug out by hand in between the machinery whilst it is still running and thrown back to the slat conveyor. The juice from the "first mills" and "second mills" is drawn off from the trough to the line tank. The "second mills" is similar to the first and again usually consists of two mills and are different only in that juice from the "third mills" is pumped back to discharge over the cane between the first and second mills. The "third mills" nowadays comprising up to four sets of very fine mills, which again work similarly to the first but pure boiling water is added to the slat conveyor at a similar rate to the draw off from the first. The juice, now much diluted is pumped back to the section between the first and second mills. From the "third mills" the remaining cane (bagasse) now with up to 95% of its possible sugar removed, is lifted from the trough to feed the boilers and to stockpile.

All of the mills and conveyors are driven by a continuous row of gear wheels around 15" wide and up to 8 ft diameter. The length of run from input conveyor to third mills exceeds 300 ft. Adjacent to the third mills a two cylinder Mirless and Watson No 2 stationary engine provides the drive to the power line. Two 24" diameter x 42" stroke cylinders drive a 36 ft diameter flywheel, the geared edge of which engages with the mill's gear train. The engine rotates at approximately 6 rpm the unprotected edge of the flywheel passing by at around 90 mph. A smaller 18" diameter x 36" stroke single cylinder engine behind the Mirless Watson provides power for all of the ancillary conveyors and a number odd mechanical pumps.

In an adjacent building six Bellis and Morcon high speed three cylinder compound engines dated 1924, drive generators providing electricity to light the plant and a number of electric pumps and overhead cranes used to replace the mills. Until the coming of mains electricity in 1949 these engines also provided local electric power as long as the bagasse lasted. All exhaust steam is re-used for water and sugar heating etc until it is finally condensed by discharging directly to the "pond", a field size open tank used for feed water and to make the juice!

Drawn off juice passes to 5,000 gallon cylindrical copper tanks where bagged lime is added to assist in precipitating the impurities. The juice is heated by steam in a vat of 4,000 gallons capacity and passed into large baffled settling tanks from which the "mud" is drawn off from the bottom and clear juice from the top.


CANE FROM FIELDS
CRANE LOADS ONTO FEEDER TABLE
BAGASSE
WATER FROM LAKE
TIP
KNIVES.
FEEDER TABLE
STEM
WATER FROM LAKE
BOILERS
JUICE FROM 1ST & 2ND MILLS
JUICE FROM 3RD MILLS
LIME
JUICE HEATED
LAKE
STEAM
WATER
WIER
CLEAR JUICE
TO FIELDS
FILTER
MUD
SETTLEMENT TANK
JUICE FORM MUD
STEAM
STEAM FROM EVAPORATION
TO LAKE
CONDENSOR
WATER
TO LAKE
WATER
TO LAKE
STEAM
TO LAKE
MOLASSES
CENTRIFUGE
RAW SUGAR
TATE & LYLE
MOLASSES & CRYSTA

The mud is picked up by a 12 ft diameter fine mesh drum which revolves slowly through the tank, then sprayed with water whilst an internal vacuum draws any remaining juices through the drum and returns it to the clear juice flow.

The juice is then pumped to the evaporators which are identical to the vast copper whisky stills, familiar in Scotland. In these, and six or more may be in series, the juice is boiled, the resulting steam being used to heat the next evaporation and so on. The pressure in each evaporation is lowered successively so that the boiling temperature drops in each in turn. Finally the boiled off vapour is condensed by cold water, lowering the pressure in the last evaporator where the juice is now syrup in the holding tank. This tank is also steam heated and the steam condensed to lower the pressure, but the syrup is drawn off into long paddle baths where it cools into mosasses and sugar crystals.

The thick dark brown mass that now exists is passed into a centrifuge where the molasses are drawn off and the brown sugar that sticks to the walls of the centrifuge is conveyed to silos for transport. The sugar is often twice centrifuged with the first molasses being returned to the evaporators and only the second being stored in the molasses tank to be used for rum, industrial alcohol and cattle feed.

There has been little difference in this process in 150 years except the final extract of the sugar from the syrup. Up until the early 1930s and even through to the mid 1950s the syrup was poured into thousands of artillery shell shaped clay moulds around 15" diameter and 3 ft long. A small hole at the pointed end allowed the molasses to drain out and when the sugar was set the mould was turned out and the resulting "sugar loaf" transported. The American "Westinghouse" industrial spin drier was successfully used to separate the sugar and molasses, the sugar being scooped out by hand after spinning. In 1985 sixty four such driers were still in use at Porters factory.

Prior to the current "health awareness" 98% of sugar consumed in the UK was white. Sugar from beet is grey and somewhat unappetising. After arriving in the UK raw brown sugar is first affinated, that is mixed with syrup and then washed and centrifuged at ultra high speed, then filtrated by dissolving in water, the impurities being precipitated by adding chalk, milk of lime and carbondioxide with the suspension being removed by plate and frame filter. It is then decolourised by passing through beds of animal charcoal. Afterwards it is boiled in vacuum pans with the crystals being separated from the liquor by centrifuge and finally granulated by drying the crystals in currents of hot air. The resultant sugar with all of the natural goodness removed is 99.9% pure sucrose.

The main roof structure for the new process hall was designed by the end of January 1963, shipped from the UK in June and the factory returned to operation for the 1964 season. Plans were put forward for a new modern factory to take over Porters, which it was felt could not be retained for more than 20 years without major reconstruction and also to take in the work of at least eight small factories that were operating with even older equipment.

In 1966 Barbados gained independance and the start of tourism. In the same year the Barbados Hilton was completed but real tourism did not start until the mid 1970s. The in-time for the West Indies is December to April which is also the cane season. Porters factory is nearby the most exclusive

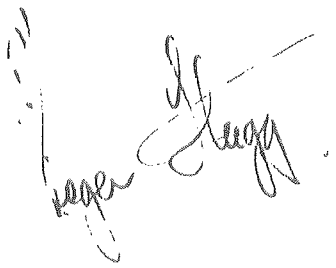
beaches of the South West Caribbean and the smoke and smuts were unacceptable in a country where the glut of world sugar and the EEC restrictions had brought tourism forward as the main currency earner.

In 1976 the Government resurrected the plans for the new factory, design took place in 1979/80 and the structure was completed in 1983, fast by West Indian standards. By the end of 1984 the machinery, most of it from Canada and the USA, was installed and the first test run took place on 21 January 1985.

Modern continuous feed boilers, still fed by bagasse, provide high pressure steam to four steam turbines which drive all of the machinery by electrical power. Port Vale factory is six miles inland and away from the tourist areas.

On 11 May 1985 at 3.00 pm I wound down the wheel which shut off the steam supply to Porters factory for the last time. Three days later dismantling of essential machinery began for transport to Port Vale. Twelve months later the steam engines remained all greased and still looked after daily, free of charge, by the machine minders who worked at them for a lifetime. The huge copper evaporators lay untouched, there are no totters in Barbados. In 1986 Porters was a ghost town but by now it may have gone.

I have some photographs of Porters in 1986 which I will give to Sue, they are dark and it is not possible to reproduce them but if one puts them on the board it may give some impression of the vast machinery and the total lack of protection in a factory where the annual death toll caused by machines was never less than five.



This'n'That
(some more)
by
J.Ewins

My comments on boiler testing in the last Newsletter brought forth a "correction" from our worthy Secretary. Herewith a correction to the correction. I said there was no mention of boiler testing in our Rules which there is not. Our Secretary was quoting from the Byelaws in which byelaw No 1 of Section B calls for all boilers to be tested to a standard "at least equal to that required by the Society's insurers". It is here that the difficulty arises because by this regulation a tester can impose any condition he wishes provided by so doing the standard is raised above that required by the insurers. A tester can for instance fail a boiler for the slightest weep as was the case with my friend's boiler mentioned previously. In a discussion with our Secretary it became clear that my original suggestion of stating in the Rules that boilers must be tested to our insurer's requirements would cause difficulty with boilers tested other than by our testers. In view of this it seems that the solution lies in modifying byelaw No 1 to take into consideration both catagories of test by adding a sentence:- "Boilers tested by the Society's testers shall be carried out in accordance with the requirements of the Society's insurers." I understand that the committee is now considering this change and will no doubt let it be known what it proposes. For my part I have discharged my responsibility in alerting members to an unsatisfactory situation that could develop and I am prepared to leave it at that. Personally it does not affect me since I do not have to submit my boilers to testing by the Society.

Whilst on the subject of boilers I was intending in the last This'n'That to say something on their construction particularly in respect of safety. However that last instalment was getting rather longer than was desirable in view of the cost of printing so I decided to leave it over until this time. Curiously the only feedback I received from that instalment was from a member who accused me of writing too much "padding". It is significant however that this particular member is regarded as doing well if he achieves a complete circuit of the track without incident. Perhaps if he paid more attention to my 'padding' he would do better on the track?

Now back to boiler strength. It is a fact that copper boilers constructed as they have been for many years are intrinsically safe. This is a fact which emerges from the almost complete absence of dangerous failures to date. This is however a situation in which complacency can result in a gradual reduction in vigilance to the point where catastrophic failures begin to take place. Over the years I have made 10 boilers and with each I have gathered information directed towards locating weak points in construction. Additionally I have conducted tests in the Materials Laboratory at University to study the anomalous behavior of copper under stress. I have published the results of this study in the S.M.E.E. Journal in E.I.M. and elsewhere but as I have come to expect "the establishment" has taken no notice of it preferring to rely on intuition and guesswork. Be that as it may, a copper boiler is so tolerant of poor structural design that over the years apart from the occurances cited above no more than a few bulges and an occasional collapsed tube have occurred. You may say what's all the fuss about? Well prevention is better than cure so that if we can prevent a possible future catastrophic failure now is the time to act. Recently a number of firms and individuals have started to manufacture boilers in a commercial way. These concerns have perforce to trim their techniques in order to keep prices down and here lies a possible source of danger. I am not saying that as of now any of these manufacturers indulge in unsafe techniques but there is evidence of a willingness to use untried methods and this is

particularly evident in the longitudinal seam necessary on boilers having tapered barrels. It has even been suggested in the Model Engineer that this joint would be satisfactory if butt joined using phosphorous containing alloy. In my opinion this joint is the only constructional point on a conventional firetube boiler which could fail catastrophically. Such failures I have heard about have occurred here, two resulting in the boiler taking off from the chassis. I therefore feel that whether a boiler is made in the trade or privately this seam should have an external butt strap riveted and silver soldered. If it has an external strap this can be seen to exist and examined by the tester. I have been told by some professional boiler makers that their work is beyond reproach and this may well be the case but who is to know in 10 or 20 years hence that a particular boiler has been made by such a manufacturer?

The only other aspect where boilers could become dangerous is at points where relatively large apertures are closed by covers held by a ring of studs or screws. If these screws are of ordinary steel they can rust away in the vicinity of the joint. There have been cases of dome covers flying off but so far as I know nobody has yet been hit by one but this is as they say an accident waiting to happen. These screws should be drawn bronze although stainless steel of EN 58 specification (non magnetic) is acceptable. In any case it is prudent when concerned with an unknown boiler to remove one of these fixings to inspect for deterioration.

Safety Valves

One aspect of my experimental work was concerned with obtaining data necessary to be able to design safety valves which would conform to the Southern Federation test requirements. I have previously provided you with a summary of these results but recently I have written a computer program by which the design can be established very quickly. The program runs on the Amstrad 8256 using Basic and is available to any member who would like a copy. Another program I have written involves the general design of model steam locos and this will shortly be appearing in E.I.M. Again if any member would like a copy they can have it in one form or another.

One of the difficulties raised by the Southern Federation safety valve test requirement is that of providing a suitable valve within a scale outline. This is rendered all the more difficult on engines having large wide fireboxes because their grates have a large capacity for heat generation if driven hard by an effective blower and due to their boilers being built right up to the loading gauge there is very little height left for a tall valve. On my 9F I anticipated this limitation and built into the boiler "pockets" to accomodate tall valves without protruding in an out-of-scale way above the loading gauge. These pockets are fed by large bore pipes drawing steam from the highest point in much the same way as is done in the prototype where sheet metal chutes perform the same function. Currently two designs are appearing in the model engineering press which stand a good chance of coming up against this problem. These are the 9F design in E.I.M. and the Ariel in the Model Engineer. Builders of these engines would be well advised to fit these pockets during the construction of their boilers as it would be difficult to put them into a completed boiler.

Positioning of Clack Valves

Feed points for water on boilers call for a little consideration to avoid unforseen pitfalls. On G.W.R. boilers the feeds are usually into the safety valve bush and on the prototypes internal pipes lead the water down to trays in the steam space. Some model designs just terminate the feed adjacent to the safety valve with the result that water fed in whilst the valve is discharging promptly comes out again with the steam. Clearly internal pipes must carry the feed well away from

the safety valve. Another trap into which I must confess I fell myself is that of feeding into the underside of the barrel as is advocated by Martin Evans in his Stirling Single design. I did the same on my "Riddle" and from time to time I am bothered with this clack getting held up with pieces of scale dropping down to the bottom of the barrel and then into the clack. It is one of those things you wouldn't think would happen but it does. Fortunately I anticipated trouble here and have provided an alternative entry point in a more conventional position. Some time when I have nothing else to do I will re-arrange things. Actually I am not too much bothered because my injectors will deal with any amount of blow-back but others using commercially made injectors or those to published designs would be well advised to find an alternative position for this entry. A similar situation applies to clacks fitted low down on the backhead.

Leaf Springs

The laws of scale are such that leaf springs made to scale are far too stiff. A number of methods are advocated to get over this difficulty such as using a large number of steel leaves grouped in numbers to simulate the scale thickness of prototype leaves,- terrible! Another dodge is to use Tufnol which is almost as bad. The complete answer which is so simple is to use phosphor bronze strip of scale section and punch out the centres of leaves below the top one. This method not only presents a truly scale outward appearance but also lends itself to fine tuning of the spring rate by punching out more or less of the intermediate leaves.

Joining Bandsaw Blades

This topic has appeared in the Model Engineer under the heading "Consultant's (Sic) Corner", from which no solution has been forth coming. Many years ago I bought a bandsaw and gave up trying to use it because the saws were so unreliable. I tried purchasing blades ready joined, brazing them myself,resistance brazing, butt welding all to no avail the blades breaking after very little service. Finally however I hit upon a modification of the time honoured method of 'tong brazing'. As formally used this method consisted of heating up a pair of heavy tongs and grasping the prepared blade between them utilising the residual heat in the tongs to run the spelter at the same time bringing the spliced ends into intimate contact.

The failure of other methods arises due to the overheating of the blade metal causing it to fail prematurely from fatigue induced by the continued bending and straightening as the blade passes around the wheels. My adaptation of the tongs method ensures that at no time is the metal heated above its lower critical temperature and to achieve this I use Easyflo silver solder which runs at a little over 600 deg C. Methods such as butt welding and resistance brazing are usually followed by an annealing cycle but in my experience with them, once the metal has been overheated it is never the same again. My blades do sometimes eventually break because I tend to get the last out of them by forcing the cut when they are blunt but when this happens the break is never at the joint but a little way from it. Apparently Burgess test their blades by running them the equivalent of 45 miles at high speed. When I was cutting up the sleepers for my track I produced 1300 of them from 2" X 2" section involving 4 hours cutting which was accomplished with a single blade travelling over 500 miles.

My method is carried out as follows. A suitable length of material is cut from the reel by breaking off with a pair of pliers and grinding away about 1/8" so as to get clear of the broken end. Next the two ends are chamfered to form an overlap of about 3/16" on a 1/4" blade. It is necessary to do this on a grinding wheel but good care should be taken to see that the material does not become red hot.- I sometimes finish off with a file to get a true result. The two ends are brought together in a rudimentry jig consisting of a piece of 2" X 2" wood about a foot long with half of its section cut away at its centre the blade being clamped

in place by a couple of 'G' clamps holding the ends in this cut-away section in line and with an over-lap to the extent of the chamfers. A piece of Easyflo foil is inserted between the chamfers along with some Easyflo flux and the whole suitably fixed at a comfortable working height. Next an old pair of flat nosed pliers having substantial jaws, if necessary cut down, are selected and using a suitable torch (I use a Sievert type 3940) the pliers are heated until the ends of the jaws are red hot when the flame is carefully transferred to the saw and as soon as this becomes dull red and the solder has run the pliers are snapped around the joint. All that is needed to complete the work is to file away any surplus solder and flux.

I fear that some of the commercially available band saws suffer from having wheels which are too small in relation to the thickness of the blades used. My machine has 12" dia wheels and I usually use .025" thick blades. For soft metal and wood I use "skip tooth" type run at about 5000 ft/minute, whilst on mild steel I find that 14 t.p.i. normal toothed blades run at about 200 ft/minute give good service. The council of despair expressed in the Model Engineer need not be if the above technique is followed through and whereas previously I had given up my bandsaw I now find myself running to it for even the simplest sawing job.

A similar situation arises in respect of linishing machines and their abrasive belts. There is on the market a number of moderately priced machines but the bands for these cost several pounds for even the smallest. I join up my own from reels of off-cuts which I obtain from Alan King of Sidcup. Here the trick is to make the scarfed joint without the overall thickness being greater that the rest of the band. To achieve this I find that it is best to remove the abrasive material and its bonding coat in the vicinity of the joint leaving just the fabric to be chamfered down to about half its thickness at its thinnest point. This I do with an angled grinder fitted with a stone cutting wheel. I do the bonding with Araldite, clamping the joint between two substantial pieces of metal interspersed with thin paper to prevent sticking. In this way one can make up about 100 bands for the cost of one ready made. I have two linishers but I find the smaller one the most useful for the quick shaping and squaring off of work pieces and truing the edges of sheet work.

Comment

A letter in the current issue of the Model Engineer suggests that owing to Metrication we need a new value for π! This caused me some head scratching until I realised I was reading it on April 1st.

Conclusion

This concludes the miscellaneous topics under the heading This'n'That. There are many other minor ones but I will not bore you with what might be regarded as padding. This series of articles has been spread over several years now but during this time I have had little evidence that members have much interest in them or even read them. Indeed from what I see and hear they seem to be ignored or even worse. This is in keeping with the general attitude in model engineering circles of being prepared to be guided by what vociferous ones say and to pay little attention to what active ones do. Reading various model engineering publications I am struck by the number of times I see young would-be authorities making just the same mistakes my generation made 50 years ago. I sometimes think I have got it all wrong in trying prevent this and that this cycle of discovery and re-discovery is just part of the lark. C'est la vie.

I feel that Jim Ewins's references to our worthy Secretary who was speaking for the Committee on The Byelaw relating to the subject of Boiler Testing needs a few comments on the position of the Committee and our long suffering Boiler Testers of which I happen to be one.

Firstly Byelaws are made by the Committee and because they are Byelaws are debated in depth before being implemented, any changes must be agreed by the full Committee but changes can be made if deemed necessary. Byelaw No. 1 Section B has been discussed at considerable length by the Committee and it has been decided that NO changes will be made at present to our Boiler Testing procedures.

The thinking behind this decision is as follows:

It was felt that the confidence of our insurers would be maintained if their requirements are still treated as a minimum.

However, having said this, I would agree with Jim that we must be aware that the responsibility of a fair and safe test of any boiler is dependent on the common sense of the Tester when he considers it necessary to go beyond the Southern Federations Minimum Requirements.

As a Boiler Tester of some experience I would be very reluctant to have to argue with the owner of a boiler that I had grave doubts about and wanted to investigate further just because it actually passed the minimum requirements.

An example of this I have come across is a larger number of Stays than I would consider normal, weeping on Hydraulic Test. On investigation it proved that the Stays had been sealed with one of the self fluxing alloys some so called experts have advocated in the past re "Silfos" this type of alloy degrades in the presence of sulpher fumes. The exact conditions inside a Firebox and the Stays which were plain rivets were not taking their full proportion of the load allowing the Firebox crown to flex.

The important point about this example is that any Boiler inspector must be free to use his judgement and expertise, unfortunately it can also give rise to the problem to varying degrees of the "Bloody Minded" Boiler Inspector.

My suggestion to any member who feels he has a grievance over a Boiler Test is that he raises the matter with the Committee who will arrange for a test to be carried out by another Inspector.

I hope, however, that in our Society this situation is not going to arise, but in conclusion the Committee feel we must allow our Boiler Inspectors to carry out their important task, which must include some element of experienced judgement, in a manner likely to maintain safety standards and allow us to keep our very favourable insurance arrangements.

G. Kimber
(Chairman, on behalf of the Committee)

Hello to you and welcome to Sue's spot.

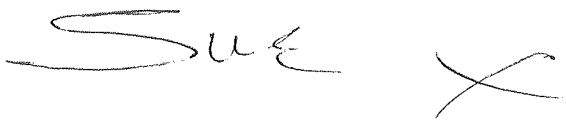
I am pleased that we have a nice thick newsletter for you this time and my thanks to all those who have contributed. It is not too early for any of you to consider an article for the next newsletter which is due out in August - the sooner I can have any items the better as it is easier to print them early rather than later. I would love to hear from any of those who have not contributed before as well.

Here we are on the brink of another running season, the daffodils are blooming, the days are getting longer, the sun threatens to come out from time to time and suddenly the world seems a brigter place. For me the running season this year is more special because I finally have an engine of my very own (or rather Adrian's) to drive and to use to transport passengers for the benefit of the Society. After nearly seven years the Enterprise (2-6-2 LNER Class V3 tank locomotive in 5" gauge) has taken to the track and steamed through her boiler test with flying colours. An anonymous black engine, my suggestions at calling it Warp Factor One or Beam Me Up Scottie were met with the contempt they deserved and our engine has no name but a number (although this is fictitious being 1987!). I hope that you will all be pleased at my Old Man's achievement as well although I admit the door frame needs widening to fit his head through as it is. Our pride and joy weighs nearly one and a half hundredweight and I am soon to take up weightlifting to help carry it - it's easier lifting Adrian!

Enough of my rambling on but then I'm looking forward to going where no man has gone before, to seek out new worlds, new civilisations and new clubs, etc. Perhaps my next column will be entitled Sue's Trek, the voyages of the LNER Enterprise.

The Winter is a traditionally quiet period at Mote Park (apart from the hubbub of the Boxing Day run of course) but was not spent in total hibernation by our members as indicated by the improvements in the Clubhouse and the progress with the Club Loco. The Summer is packed full of events, the biggest for us being the Open Day on a different date this year, Saturday June 20th. Please contact me nearer the time if you can help - all assistance is greatly appreciated so that we can give the visiting clubs a day to remember. Tim Keenan has kindly agreed to come and give us another talk and slide show for the May Club Night and then we have a plethora of evening runs while the weather is more clement (wishful thinking), June is a fish 'n' chip evening, July a fancy dress! No theme this time but a prize for the best male and best female. August is barbecue time. Please read the Club Noticeboard for details of Club Events and visits arranged. Our Secretary can also be contacted for up to date information.

Happy Easter folks and as usual I look forward to seeing you all.



P.S. Just because I have an engine of my own to drive this does not mean I do not want to drive anyone else's!