

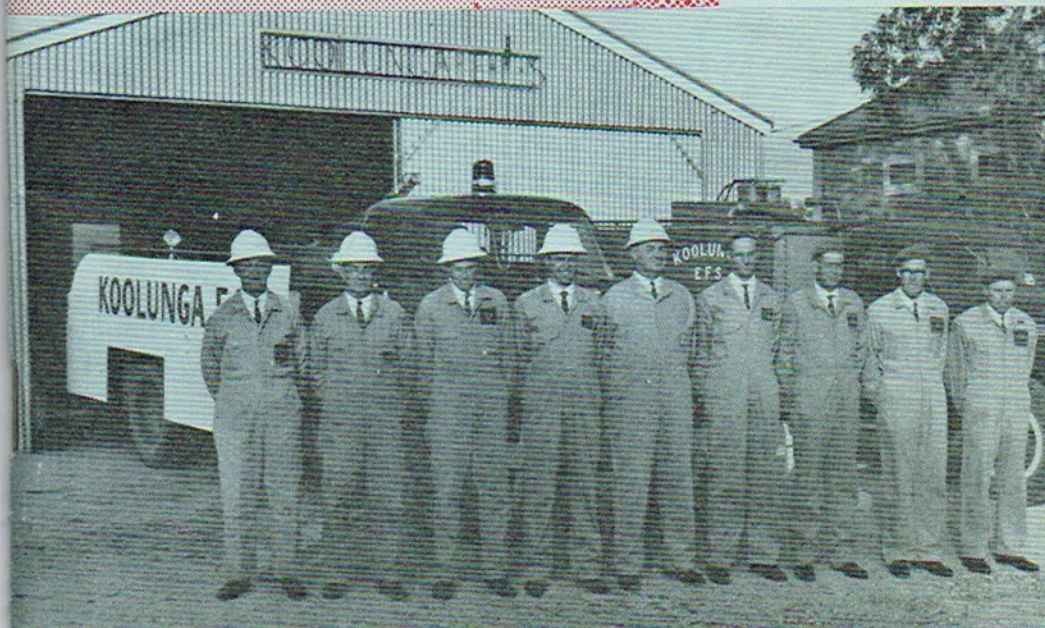
SOUTH AUSTRALIAN
EMERGENCY
FIRE SERVICES

*E.F.S.
Manual*
1968



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Foreword

By Brigadier J. G. McKinna, C.B.E., D.S.O., M.V.O., E.D.
Commissioner of Police

Despite the fact that conditions in December, 1967, were considered more dangerous than those prevailing just prior to the disastrous fires in January, 1939, the number of fires attended dropped from 1,159 to 905 and the damage as a result of these fires from \$413,603 to \$334,390 when compared with the previous twelve months.

Although greater care in fire prevention by the general public and the legislation prohibiting the lighting of fires in the open on banned days have contributed to these reductions, I am very mindful of the enthusiasm and efficiency of the 395 registered organisations and affiliated bodies as well as the 8,500 E.F.S. volunteers who render such an outstanding service to the community.

S.A. EMERGENCY FIRE SERVICES: HEADQUARTERS STAFF

Mr. F. L. KERR, M.B.E., M.I.FireE. (Director of Emergency Fire Services).

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SENIOR CONSTABLE A. H. GEESING (Staff).

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E.F.S. Headquarters' postal address is: Police Barracks, Thebarton, South Australia 5031. Telephone numbers are 51 7344 (direct line), or 8 0333 (Police Headquarters and after hours number).

E.F.S. STATISTICS, 1967-68
(From July 1, 1967, to June 30, 1968)

Children with matches	101	Refrigerator—Electrical	1
Burn-off out of control	76	Refrigerator—kerosene	1
Justified calls	46	Incubator—kerosene	1
Rubbish (dumps and in open)	42	Infra-red lamp falling	1
Electrical faults	38	Galahs on power line	
Re-ignite	38	(breaking)	1
Chimney fires	37	Rotary slasher	1
Incendiary fires	35	Diesel engine overheating	1
False alarms (malicious)	28	Line fault	1
Incinerators	26	Bag wrapped around flue	1
Camp fires	20	Oil heater	1
Ignition flammable vapors	19	Hot fruit dip	1
Stoves and domestic fire		Overheated fat fryer	1
places	19	Soldering iron left on	1
Exhausts — sparks, conduc-		Domestic iron left on	1
tion	18	Electric heater left on	1
Cigarette butts	15	Carburettor blow-back	1
Welding	15	Ignition of hot tar	1
Spontaneous combustion	11	Wood against copper	1
Friction	8	Unknown	242
Vehicles crashing	7		
Hot ashes	7	Number of Fires Reported	
Unattended fires	6	Rural fires	605
Lightning	4	Domestic fires	300
Glass in sun	4	Total	905
Dropped matches	3		
Smoking out bees	3	Special Service Calls	
Smoking out rabbits	2	Rescue : Search : Salvage	22
Brake shoe on trains	2		
Tree touching power lines	2	Damage and Financial Loss	
Kerosene heating appliances	2	Rural fires:	
Sparks—wood copper	2	Acres destroyed	42,145
Sparks—train	2	Financial losses	\$37,676
Sparks—honey extraction		Domestic fires:	
plant	1	Financial losses	\$296,714*
Sparks—wood-fired boiler	1	Total financial losses	\$334,390
Sparks—chain saw	1	* Includes:	
Fireworks	1	Sawmill (Bahannah)	\$50,000
Gas—heating appliances	1	High School (Clare)	\$30,000
Gas—broken main	1	High School (Salis-	
Gas—stove explosion	1	bury)	\$40,000
		Semi-trailer and load	\$20,000

The attention of all Officers-in-Charge and Secretaries is drawn to the note at the foot of the current E.F.S. Fire Report issued to all Brigades regarding the PROMPT return of these reports.

FIRE CALL TELEPHONE NUMBERS: Readers are advised to obtain telephone numbers locally, and to record them near their telephones.

Editors, or other interested persons, are invited to reproduce any articles appearing in the "E.F.S. Manual", either in whole or part, with due acknowledgment to the source and author, where shown.

This year, the "E.F.S. MANUAL" is honoured to feature an article by a universally acknowledged authority on fire control methods, Mr. Alan G. McArthur, B.Sc.(For.), Officer-in-Charge of Protection Research in the Forestry and Timber Bureau, Canberra, A.C.T.

Mr. McArthur is noted for his research into the characteristics of bush fire behaviour and this article exemplifies much of his work in the field and the results of this exacting research.

Last year's "MANUAL" gave information on a 'Grassland Fire Danger Meter' which he had devised for assisting in the solving of fire problems in the field. Copies of this handy device are still available from E.F.S. Headquarters free of cost.

After the disastrous Southern Tasmanian bushfires early in 1967, Mr. McArthur and his team investigated and reported on the fires, at the request of the Tasmanian Government.

On page 13 are listed publications which are available from the Forestry and Timber Bureau in relation to fire control. These should form part of every E.F.S. Brigade Technical Library.

—EDITOR.

THE EFFECT OF TIME ON FIRE BEHAVIOUR AND FIRE SUPPRESSION PROBLEMS

By A. G. McARTHUR

Forest Research Institute, Forestry and Timber Bureau, Canberra.

The factors which influence fire behaviour have become reasonably well-known over the last fifteen years or so through experimental fire behaviour studies and detailed investigation of the behaviour characteristics of large wildfires.

At the present stage of our knowledge there are around fourteen variables which affect fire behaviour. These include weather factors such as air temperature, relative humidity, solar radiation, seasonal dryness, wind velocity; fuel factors such as fuel quantity, size and arrangement; topographic factors such as slope, mountain and valley affects and differential slope heating and finally such factors as fire size and shape. In addition to these essentially surface phenomena, there are such factors as atmospheric instability, upper wind structure and other features of the atmosphere and combustion physics which are significant under certain circumstances.

From an operational viewpoint, it is fortunate that probably 80 to 90 per cent. of fire behaviour is controlled by the ten or so factors which are fairly easily measured and can be incorporated in a relatively simple system of fire danger measurement such as the Forest or Grassland Fire Danger Meter. (Refer to "EFS Manual" for 1967). These meters can give an estimate of rate of spread, flame heights, radiation intensity and spotting potential which is sufficient for fire control planning at the present stage of Australian fire control development. As more sophisticated and expensive methods of fire suppression come into use, there will then be a greater need for a more precise description of fire behaviour in specific environments. This greater degree of precision can be met when the time comes by incorporating some of the harder to measure factors into our fire behaviour forecasting systems.

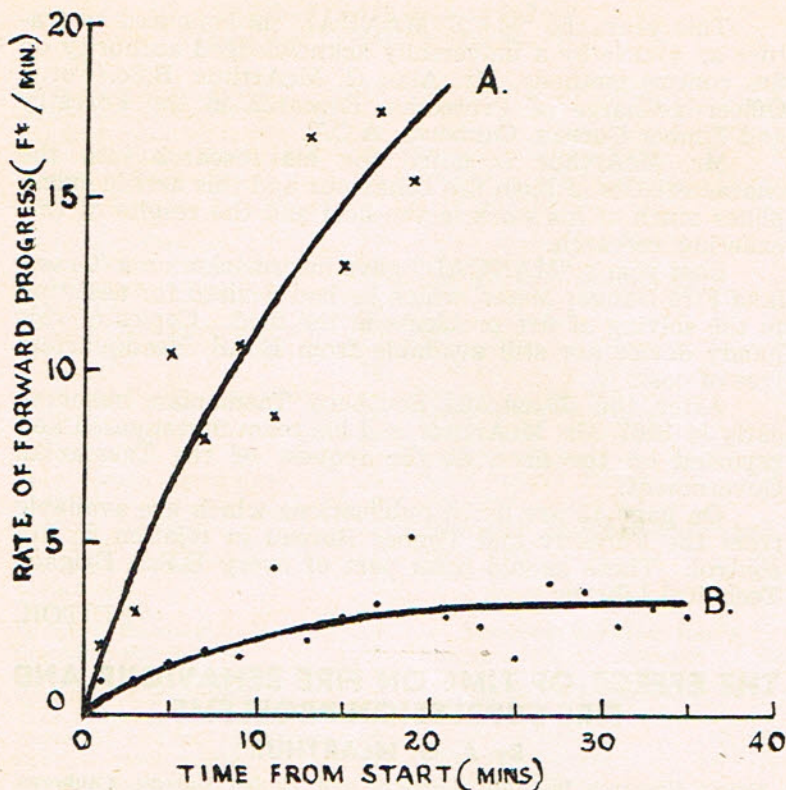


FIGURE 1—The acceleration effect in the initial stages of a fire starting from a point origin:

- (A) Fire No. 1206. Black mountain A.C.T. 20/2/68. T. 91 deg. F. RH 21 p.c. Wind 16 m.p.h. (open). Slope 9 deg. Fuel quantity 9.4 T.P.A. Fire danger index 34 (very high).
- (B) Fire No. 988. Black Mountain A.C.T. 13/2/68. T. 80 deg. F. RH 21 p.c. Wind 6 m.p.h. (open). Slope 5 p.c. Fuel quantity 6.7 T.P.A. Fire danger index 17 (high).

One variable which has received very little mention in fire control literature is the effect of time on many aspects of fire behaviour, especially such factors as rate of spread, area increase and spotting potential. The processes which take place from the time ignition occurs until suppression action commences forms one of the most interesting and significant studies in fire behaviour. During the first 30 minutes or so of a fire's life history, suppression forces have their greatest chance of success purely because the fire is still accelerating and has not reached its maximum rate of spread and damage potential for the particular combination of fuel, topography and weather conditions under which it is burning.

The thorough planning of an initial attack system must be based on the knowledge that all fires accelerate from the time flame first appears through a variable period depending on a number of factors until a "steady state" spread is reached.

The importance of the time factor in fire control increases as the fire danger increases. If a fire starts at a fire danger index of 100,

probably the only chance of controlling the fire in heavy fuel concentrations occurs in the first 15 minutes or so. Once beyond this point the fire is generally uncontrollable despite a maximum suppression effort.

The sense of urgency decreases as burning conditions become milder until at low or moderate levels of fire danger, a gang of two or three men can generally control a fire in eucalypt bush even when it has been burning for an hour or more. Under the same level of fire danger, a grassland fire may require one or two tanker units but the head is frequently self extinguishing when it meets a road or some natural barrier.

However, there is need for caution even under the mildest burning conditions. If any fire is allowed to burn unattended for a period of some hours or even days, it can attain a size that is beyond the resources of the suppression organisation to extinguish; despite the fact that the rate of forward progress may only be one or two chains per hour and it is not exhibiting any acceleration effect. Frequently this delay in attack time may be due to problems of access, topography and availability of manpower and equipment.

Under severe burning conditions, all fire behaviour characteristics tend to accelerate with time, whilst a fire burning under mild conditions burns at a constant or near constant rate. One of the fathers of forest fire research, S. B. Shaw, discovered this fact whilst studying experimental fires in California back in 1917, and many of his conclusions are still valid today.

What are the factors which tend to accelerate during the early part of a fire's life? In practice just about all things about a fire which might be lumped together and termed "fire behaviour" tend to accelerate or increase with time. These include:—

- (i) Rate of forward progress
- (ii) Rate of perimeter spread

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- (iii) The flame height.
- (iv) Fire intensity or the amount of radiant heat given off by a unit length of fire edge
- (v) The convection circulation over the burning area including the formation of a chimney or flue effect
- (vi) The velocity of indraft winds and fire whirlwind formation
- (vii) The transfer of discrete ignition points or the spotting process
- (viii) The physical damage done to individual components of a forest stand and to the soil and other resource values
- (ix) Area and so total damage.

The last factor mentioned, area increase, should perhaps not be considered as a true acceleration effect because area increases as a power function of time even when a fire is burning at a constant rate of spread. However the increase in area is very dramatic during the acceleration period. In the early stages of a fast burning accelerating fire, area may increase by a factor of 10 as the burning time doubles, but this may decrease to a factor of four or less during the steady state period.

Under worst possible conditions all the factors mentioned above accelerate smoothly and fairly quickly to the ultimate of a full crown fire in a forest stand with flame flashes exceeding the height of the stand and with a towering convection column showing distinct atomic explosion characteristics in which a huge number of burning embers are being sucked up into the column and a small percentage of these are being deposited out at some considerable distance ahead of the actual moving flame front.

In forest fires the main acceleration effect undoubtedly begins with the commencement of the spotting process which is so characteristic of fires in eucalypt fuel types. The acceleration effect of a high intensity fire can be recognised as various distinct stages. The initiation of the spotting process is the end result of all the other stages.

Initially a fire in eucalypt forest accelerates purely through an increase in the width of the flame front which produces more effective preheating of the fuel ahead of the fire by radiation. This increase in flame front width also makes the front more responsive to changes in wind direction and velocity. This initial process may last for 20-30 minutes at a level of high fire danger but will be achieved in a much shorter time at very high or extreme levels of fire danger. A typical acceleration curve is shown in Figure 1. This curve may be relatively smooth or may occur in a series of steps as successive layers of fuel such as shrubs and finally the tree crowns ignite.

However before this first stage of acceleration reaches a steady state of spread, the spotting process has already commenced. At first a few burning embers may be thrown 20-30 feet ahead of the flame front and even these increase the apparent spread of the fire. Gradually the spotting distance lengthens out and an odd spot may be lighting up to 5 to 10 chains ahead of the main fire. These longer distance spot fires are generally associated with the first formation of a convection column. The fire may then proceed at a fairly constant rate of spread for the next 30 minutes or more with a spotting distance restricted to 5 or 10 chains.

Even at this stage of development of the fire, the suppression forces have a good chance of success so long as the topography and access is not too difficult to prevent tankers or other equipment getting the moving front stopped and the developing spot fires under control. Admittedly it is difficult and extremely dangerous to put suppression forces in front of any forest fire which has started to throw spot fires. A sudden increase in wind velocity, a change of fuel type or a change in slope may suddenly increase fire intensity and result in a mass of burning embers showering down around the firefighters. However, if the equipment is good and the firefighters

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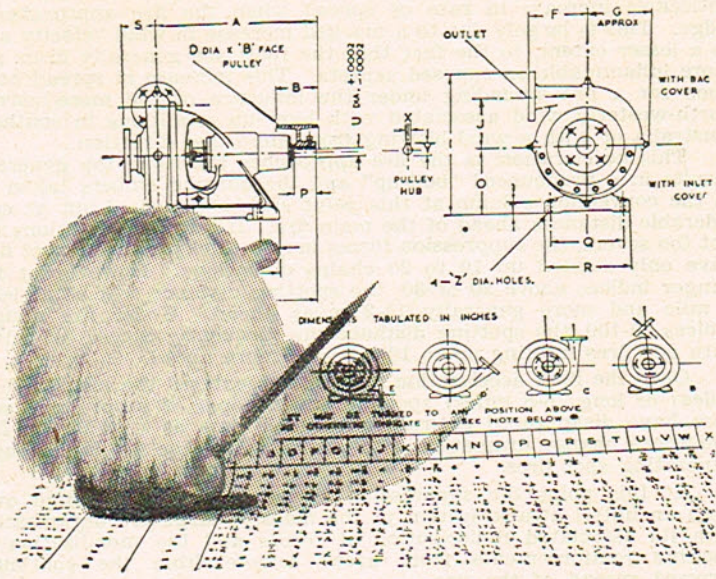
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FIGURE 2—Plan showing origin and progress of the Hobart fire on February 7, 1967. The location of the main areas of spot fire showers which caused the tremendous acceleration effect are shown in relation to the headfire travel.

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are well trained and have an adequate escape route planned, the suppression action under these circumstances is frequently warranted if the values at stake are high, such as in a semi-urban environment where life and property are endangered.

The next stage in the development of the spotting process and acceleration effect occurs when the fire front approaches a prominent ridge or hill top. Almost invariably there is a sudden and very noticeable increase in rate of spread when the fire approaches a ridge. This is largely due to a marked increase in wind velocity and, to a lesser extent, to the fact that the fuels are generally drier and more inflammable on exposed aspects. This increase in spread holds good for a fire spreading under the influence of the more normal north-westerly wind associated with blow-up conditions in southern Australia or with a wind blowing from any other direction.

This acceleration as the fire approaches the ridge top generally results in a pronounced "boil-up" and the burning embers taken up in the convection column at this point can be deposited out at considerable distances ahead of the main fire. If burning conditions are not too severe, the suppression forces may be lucky and find spot fires have only started up 10 to 20 chains downslope. However at fire danger indices above 20 or 30, the spotting distance will be at least 1 mile and more generally 1½-2 miles ahead. Under fire danger indices 50-100, the spotting distance can frequently exceed 5-6 miles, with odd fires lighting up to 10 miles or more ahead.

Once the final acceleration process has entered the medium (1-2 miles) or long (6-8 miles) spotting stage, hopes of suppression success have disappeared entirely until such time as weather or fuel conditions change dramatically to a level where the fire is no longer generating spot fires.

At this point the suppression organisation must change over from an initial attack system to the massive large-fire organisation with its associated redistribution of forces and the mobilisation of massive reinforcements from areas remote from the continued forward spread of the fire.

The type of acceleration process described above has been well documented on at least 30 wildfires which have been closely investigated over the past ten years or so. Only in the past four months, several fires including the Basin Creek Fire near Tumut on 31st December, 1967; the Basin-Upway fire in the Dandenong Ranges near Melbourne on 19th February 1968; the Bogong Peaks fire in the Kosciusko State Park on 26th February and several smaller fires have all exhibited this tendency to throw masses of spot fires at the point where a fast moving headfire reaches the top of a ridge.

Perhaps the best example of the acceleration effect of fires in eucalypt forest is given by the Hobart Fire which occurred on 7th February, 1967 and caused damage estimated at over 16 million dollars to the outer suburbs of Hobart. This fire, which was one of over 100 fires burning within a 40 mile radius of Hobart on 7th February covered an area of only 16,460 acres, yet caused damage of just on \$1,000 per acre. Acre for acre it was one of the most costly fires ever to have occurred in Australian fire control history, yet in its early stages it was slow burning and could have been easily controlled with a minimum of suppression effort.

From all accounts the fire started or was first observed around 0740 hours on 7th February and in the absence of suppression action, spread slowly upslope through very light fuels in an area which had been burnt only two years previously. From 8 a.m. to 10 a.m. the rate of spread was probably no more than two-three chains per hour and it was exhibiting very little acceleration effect due to the relatively low level of fire danger and the very sparse fuels through which the fire was burning.

At 10 a.m. the wind velocity started to increase and by 11 a.m. was averaging 35 m.p.h. Even so, the fire was still burning fairly slowly in the light fuels, but by this time the rate of spread may

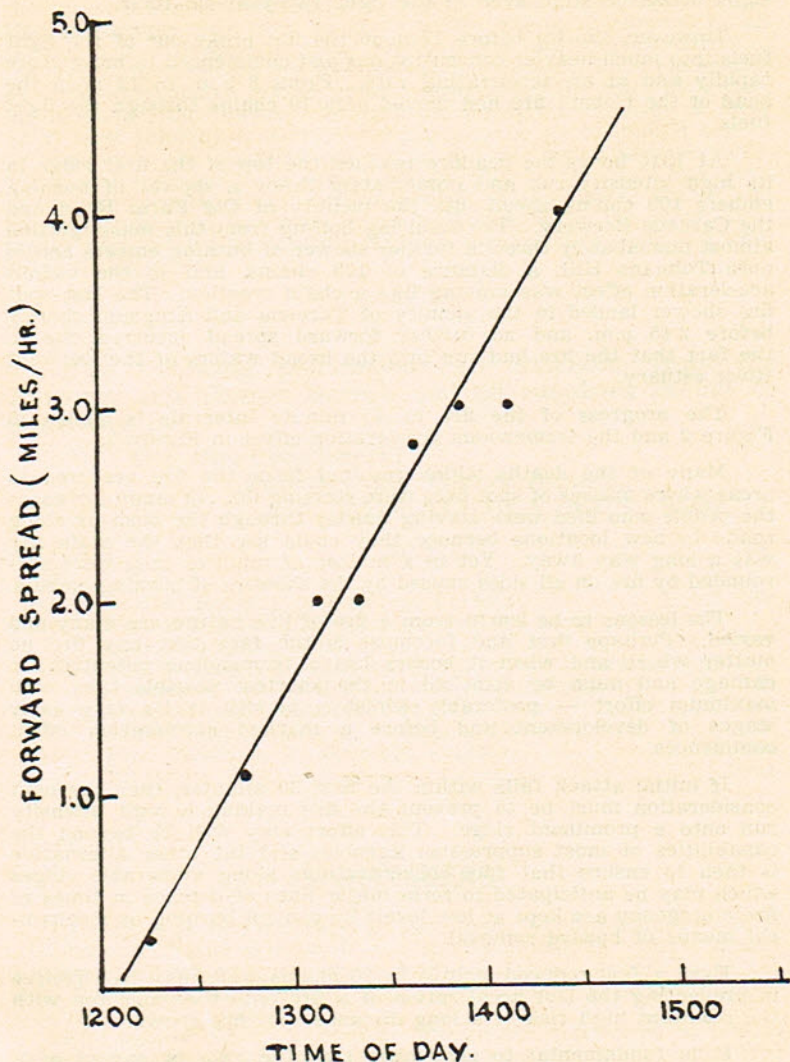


FIGURE 3—The acceleration effect on the Hobart fire during the major run on 7/2/67 caused by intense moderate distance spotting (1-2 miles). T. 10 $\frac{1}{2}$ deg. f. RH 13 p.c. Wind 35 m.p.h. Fuel quantity 7 T.P.A. (estimated). Fire danger index 95 (extreme).

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have increased to perhaps 10-15 chains per hour and was showing signs of acceleration even in the light two-year-old fuels.

However, shortly before 12 noon the fire broke out of the light fuels into much heavier concentrations and commenced to move more rapidly and at an accelerating rate. From 8 a.m. to 12 noon the head of the Hobart fire had moved only 40 chains through the light fuels.

At 1315 hours the headfire reached the top of the first ridge in its high intensity run and immediately threw a shower of burning embers 100 chains ahead into the vicinity of Old Farm Road and the Cascade Brewery. The resulting boil-up from this mass ignition almost immediately threw a further shower of burning embers across onto Tolmans Hill, a distance of 120 chains, and so the vicious acceleration effect was moving like a chain reaction. The last spot fire shower landed in the vicinity of Taroona and Kingston shortly before 2.45 p.m. and no further forward spread occurred due to the fact that the fire had run into the broad waters of the Derwent River estuary.

The progress of the fire at 15 minute intervals is shown in Figure 2 and the tremendous acceleration effect in Figure 3.

Many of the deaths which resulted from the fire occurred in areas where masses of spot fires were starting up. In many instances the people who died were moving quietly through the bush or along roads to new locations because they could see that the main fire was a long way away. Yet in a matter of minutes they were surrounded by fire on all sides caused by the showers of burning embers.

The lessons to be learnt from a fire of this nature are many and varied. Perhaps first and foremost is the fact that any fire no matter where and when it occurs has a tremendous potential for damage and must be attacked in the shortest possible time with maximum effort — preferably whilst it is still in its very early stages of development and before a marked acceleration effect commences.

If initial attack fails within the first 30 minutes, then the next consideration must be to prevent the fire making a high intensity run onto a prominent ridge. This effort may well be beyond the capabilities of most suppression agencies and the other alternative is then to ensure that fuel concentrations along vulnerable ridges which may be anticipated to form major lines of defence in times of fire emergency are kept at low levels by control burning or mechanical means of hazard removal.

Even a fuel reduced strip 5 to 10 chains wide may be effective in preventing the last acceleration of a fire onto the ridge top with the resultant high risk of a long distance spot fire shower.

It is fundamental to remember that the rate of spread of a fire is directly proportional to the quantity of fuel available for combustion, all other factors remaining constant. A fire in a 10 tons per acre fuel type will spread five times as fast as one burning in a two ton per acre fuel type and the chances of spot fires will be reduced by an even greater proportion.

The quantity of fuel available for combustion is the only significant variable affecting fire behaviour over which man can exercise some considerable control. If fuel quantity can be kept to a reasonably low value of perhaps three to five tons per acre, the chances of a fire quickly accelerating to unmanageable proportions are very much reduced and control of a fire even under worst possible conditions is well within the capabilities of an efficient fire suppression organisation.

If the values at stake are extremely high such as in many of the forest-urban environments of Adelaide, Melbourne, Sydney and Hobart thought may even be given to the complete removal of all inflammable undergrowth along roads, ridges and the boundaries of the urban development by mechanical means and the maintenance of a non-inflammable grassy ground cover under the trees by watering or some other means. In some instances the removal of trees or at least thinning to a wide spacing may be contemplated and in extreme cases the complete removal of the tree cover may be undertaken and replaced by a grass sward. This is virtually the basis of a large "conflagration" control project in the United States and has been practiced for many years in Australia by the State Electricity Commission of Victoria around the Yallourn open cut coal fields in Gippsland.

The following publications are available from the Forestry and Timber Bureau and all enquiries should be addressed to:

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102	Forest Fire Losses in Australia, 1964-65	50c
107	Fire Behaviour in Eucalypt Forests	50c
—	Water vs. Fire	Free

SIGHTSEERS

Whilst it is not contrary to law to be a "fire-watcher", it is an offence, carrying a heavy fine or imprisonment, to wilfully hinder a fire control officer in the exercise of his duties. According to the S.A. Bush Fires Act, "hinder" includes to 'obstruct, delay or interfere with in any way.'

Fire control officers and police officers are empowered by law to demand the names and addresses of persons who have committed offences against the Bush Fires Act.

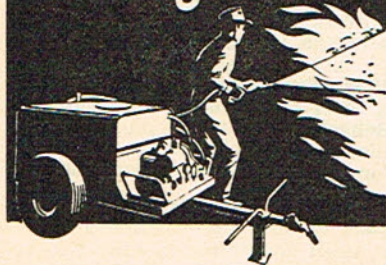
Persons who have no role in the suppression of the fire, or no justified reason for being in the vicinity, should keep well clear.

The very presence of sightseers or unessential traffic on fire access tracks or roadways leading to and from fire areas can seriously obstruct, delay and interfere with the duties of the E.F.S. and fire control officers.

Should a fire control officer be hindered by sightseers, or anticipate this nuisance, then he should notify the local police or headquarters without delay so that vital roads can be closed to unessential traffic.

Persons who wish to assist at a fire should offer their services to the district E.F.S. control centre, police station, E.F.S. Headquarters or Police Operations Room.

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IT CAN HAPPEN HERE

By J. Hogan, B.Sc., Regional Director Bureau of Meteorology, S.A.

The Hobart holocaust is gradually being forgotten and people in South Australia are drifting back into the complacent "it can't happen here" way of thinking.

Little do they realise how lucky they were that similar disastrous fires were not experienced in South Australia during the 1967/68 summer. The Hobart weather observations on 7th February, 1967, the day the fires really raged out of control in Tasmania, are compared with three days in Adelaide in January of this year on which bans had been imposed on the lighting of fires in the open.

Date	Hobart	Adelaide		
	7/2/67	18/1/68	30/1/68	31/1/68
Min.	65.0	72.8	75.5	86.0
Max.	102.8	100.7	109.5	107.8
R.H. (0900)	34	28	26	18
R.H. (1500)	13	20	14	18
Wind (0900)	NNW 7 (knots)	NNE 3	N 4	N 9
Wind (1500)	WNW 30 (gusts 50)	E 8	NW 10	WSW 10
Max. Gust (Knots)	65	44	21	34

There is a very close correlation between the reports except in the case of the surface winds, but who knows what they might have reached if an uncontrolled fire had developed in the Adelaide Hills. The extreme instability in the atmosphere associated with these conditions could have caused spot fires miles away from any going fire.

It is considered permissible to use Adelaide observations in this particular case because of the higher fuel values and greater population density in the Adelaide Hills than in the country, but similar conditions can, and will, occur in future summers when the country areas have an abundance of dry grass.

This year the early rains promise a good supply of fuel throughout the State—if we have a repetition of the weather in January we will need even a greater amount of luck than we had last summer.

I offer an agency to a qualified E.F.S. member who may wish to make money for his brigade or himself.

I have had 35 years' service with the V.C.F.A. Country Fire Authority.

Contact . . .

Norman H. Tosh, J.P., F.L.U.A.

6 OAKLANDS AVE., ROYSTON PARK 5070.

Phone—Private: 63 3539; Office: 8 7311



KOOLUNGA EMERGENCY FIRE SERVICE

As a result of a fire at Gulnare, in the mid-north of the State in 1953, a public meeting was convened at Koolunga early in the following January to discuss the possibilities of forming a volunteer E.F.S. Brigade in the town. A canvas of the district raised £1,320/4/6. This enabled fire fighting equipment to be purchased, including two Grazcos pumps. An additional S.A. Police Department 'loan' pump was obtained from E.F.S. Headquarters and all three pumps and other equipment were fitted onto quick-loading platforms as at that stage, full-time vehicles were not available.

The first vehicle was purchased in October, 1960, with a second truck three years later. This enabled the Koolunga E.F.S. members to fit them out as full-time fire fighting vehicles, making the Brigade more mobile than previously.

Koolunga E.F.S. first competed in the Annual E.F.S. Drill Competitions in 1956 and have been regular competitors each year, culminating in 1967 with winning the Region 4 (Northern) Elimination Events at Brinkworth. At the final competitions, Koolunga was narrowly defeated by the Region 2 (Lower North) team from Nuriootpa. However, another victory soon followed with the Koolunga members taking out the 1st Division in the "BP Australia Ltd." award, winning fire fighting equipment to the value of \$550. The winning team comprised of Messrs. M. Weckert (Captain); F. Whitehorn, B. Spencer, B. Freeman and A. Freeman.

In 1963, the Region 4 Elimination Events were conducted at Koolunga with Mr. L. L. Ottens as Regional Officer for that year and the Koolunga E.F.S. as the Host Brigade.

A summary of competition "firsts" and "seconds" won by the Koolunga Brigade shows the following (up to 1967): "A" Grade Hose Drill—2; "B" Grade Hose Drill—7; Pump Drill—1; Alarm Race—11 (including the finals); One Man Hose Drill—11; One Man Ladder Drill—3; Four Man Ladder Drill—1. In addition, Mr. M. Weckert has won first place in the 'Best Private Fire Unit' for Region 4 three times.

In 1966, the Redhill District Council purchased a Bedford truck and this was built into a fire fighting unit for Koolunga, replacing one of the older vehicles. The following year, Council accepted full financial control and constructed a large fire station in the centre of the town. At a well attended ceremony on the 29th February, 1968, Mr. L. L. Ottens officially opened the station. At the same function, the Bedford fire unit was commissioned by Mr. F. L. Kerr (Director of E.F.S.) and Mr. J. P. Wright of BP Australia Ltd. presented the winning team with their "BP AUSTRALIA LTD." Award equipment.

The present executive of the Koolunga E.F.S. are Mr. P. H. Longmire (president), Mr. F. W. Whitehorn (officer-in-charge) and Mr. K. G. Pedler (secretary).

Cover photo shows (Left to right): Fireman M. H. Weckert, L. R. Stringer (supervisor), Station Officer F. W. Whitehorn, Fireman P. H. Longmire (president), L. L. Ottens (deputy supervisor), Firemen B. D. Spencer, D. R. Bentley, A. S. Freeman, B. J. Freeman.

WHEN ORDERING EQUIPMENT SHOWN ON THESE PAGES —
PLEASE MENTION THE E.F.S. MANUAL

WHAT'S THE PROBLEM?

- Q. I have recently purchased a new motor car. What extinguisher should I install?
- A. We suggest a **PYRENE DRY POWDER** or **B.C.F.** Fire Extinguisher.
- Q. I operate a packing business and use large quantities of straw, what extinguisher should I have?
- A. You have a choice, either a **PYRENE SODA-ACID** or **STAINLESS STEEL AIR/WATER.**
- Q. What type of fire extinguisher should I use on sensitive Electrical Equipment?
- A. The most suitable would be a **PYRENE CARBON DIOXIDE.**
- Q. Why should I use **PYRENE**?
- A. It's the most modern and reliable equipment used by Fire Brigades, Government Departments and Industry throughout the world.

Free Quotes

Free Advice



A Complete Range of E.F.S. Equipment Available
HARRISONS & CROSFIELD (A.N.Z.) LTD.
15 KINGSTON AVENUE, RICHMOND, S.A. 5033

Phone: 57 5105 - After Hours: 65 5675

"Fire Bug in Adelaide Hills" (Courtesy of Stock Journal, 16/5/68)

"A great deal of injury to the properties of nearly every resident in the Stirling East district was occasioned by the late fire in that locality, and there is scarcely a doubt that it was purposely raised by an unscrupulous wretch who wished to burn the useless undergrowth on his own property, without any regard for the valuable gardens, etc., of his neighbours.

"In some countries, such a person would be strung up to the nearest tree, but South Australians are a quiet and law-abiding people, and frequently the greatest miscreants escape punishment through some legal flaw. The fire in question proves the necessity for some thoroughly organised means being adopted for preventing the spread of fires in the country.

"At present no precautions whatever seem to be adopted . . .

"Picnic parties often occasion fires in the hills through negligence, and sometimes they are caused by the ends of half-consumed cigars thrown down in disgust by young sparks from town . . . It is of no use cautioning these fellows against this carelessness, for they have neither the sense to understand nor the desire to avoid it if they could.

"The only way is to keep all roads clear of grass and rubbish, and to mow a clear space each summer inside each fence or other enclosure; then, if a fire breaks out, it will be possible to confine it to moderate limits. At present everyone is at the mercy of chance, and those who trust to chance are like the man who tried to cross the Atlantic in a washing-tub in the hope that chance would land him in New York." — From Garden and Field, March, 1878.

GO MODERN!

Replace those old C.T.C. Extinguishers NOW

with

APPROVED Swordsman B.C.F. Units

from

**FIRE FIGHTING EQUIPMENT
PTY. LTD.**

118 GLEN OSMOND ROAD, PARKSIDE, S.A. 5063

Telephone: 72 1000

ALSO AGENTS FOR FAMOUS
COVENTRY CLIMAX FIRE PUMPS

CORRECT ACTION WITH FAT PAN FIRES

Extract from the December, 1967 edition of the "Fire Protection Association Journal".

Very few people are yet aware of the correct action to take if faced with a fat pan fire in their kitchen — this fact emerges clearly from the findings of a recent Joint Fire Research Organisation survey into 100 fat pan fires attended in a year by one county fire brigade*. In each case a pan had caught fire and had been discovered by the occupier who called the fire brigade. The results of the survey are summarised in the table below:

Method of extinguishment employed	Number of fires	No. extinguished before the fire brigade arrived	Number of persons injured
Water from garden hose, buckets, bowls, etc.	29	19	1
Extinguishers (any type)	7	3	—
Switching off cooker, leaving alone, etc.	34	12	—
Smothering with sand, earth, etc.	5	—	1
Smothering with lid	2	2	—
Smothering with towel, cloth, etc.	8	8	—
Removal outside	15	14	6
TOTAL	100	58	8

It will be seen that only 10 of the 100 did the right thing—smothering the fire with a lid, towel or cloth. Their correct action was in every case successful, the fires being out before the fire brigade arrived.

Smothering with sand, earth, etc. was in each case unsuccessful and in one case resulted in injury.

Many people still turn to water to put out fat pan fires and in quite a large proportion of the cases when water was used, the fire was extinguished before the brigade arrived. But it can be dangerous as well as ineffective and is certainly not to be recommended.

Fewer than half of those using extinguishers were successful—but this could well have been because the wrong extinguishing agent for burning fat was employed.

The wisdom of advice never to carry a pan of burning fat is borne out by the fact that six people attempting this were injured although most of the attempts did result in the fires going out before the brigade arrived.

* Fire Research Note No. 654 "Behaviour when faced with Fat Pan Fires" by E. D. Chambers. Ministry of Technology and Fire Offices' Committee, Joint Fire Research Organisation.

(Editor's Note: See "E.F.S. MANUAL"—1966: 'Danger!—CTC on Fat Fires')

FIRE CALL TELEPHONE NUMBERS: Readers are advised to obtain telephone numbers locally, and to record them near their telephones.

John Cook's, the Workwear Headquarters!

For real rugged wear and smooth comfort, men on the job choose Yakka Work Togs, full cut from the heaviest Red Label Sanforised Drill Cloth that stands up to the hardest wear.

COMBINATIONS - - \$6.50

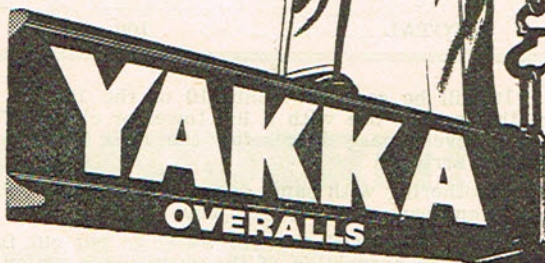
Blue, Khaki, Grey, White. 3 to 9, including 4½ to 6½; also Stout sizes, 4½ to 8½, \$6.50. Extra Stout, 9½ to 12½, \$6.99.

BIB, BRACE O/ALLS - \$4.65

Blue, Khaki, Grey, White. 3 to 9, including Stout sizes, 4½ to 8½, \$4.65; Extra Stout, 9½ to 12½, \$4.99.

We are
Official
E.F.S.
Suppliers

John Cooks will allow a special concession for quantity buying. Enquiries, phone 4 1519.



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We supply official E.F.S. Berets, all sizes available. \$1.15. Caps, \$5.25.

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Embroidery

We do all embroidery for E.F.S. Units — Headgear, Uniforms, Overalls and Shoulder Flashes.

**JOHN
COOKS**
MENSWEAR

117 Commercial Road, Port Adelaide - Phone: 4 1519

These lines also available at John Cook's Assoc. Co., Jays Men's Stores at Enfield and Mitcham.

E.F.S. ACCOUTREMENTS GUIDE

KHAKI UNIFORM OVERALLS (Fire Field Dress):

1. Hambour & Sons Pty. Ltd., 33a Fullarton Road, Kent Town, 5067. Tel. 63 4853.
2. John Cook & Co., 117 Commercial Road, Port Adelaide, 5015. Tel. 4 1519. (See advertisement on page 20.)
(Both 1 and 2 can supply uniforms, complete with Brigade shoulder name flashes, E.F.S. star badge, etc. Must be stated in order.)

BLUE DRESS UNIFORMS:

3. K. A. Ludgate Pty. Ltd., 401 Marion Road, Plympton, 5038. Tel. 53 5112.
4. Dixon Clothing Co., 80 Angas Street, Adelaide, 5000. Tel. 23 5793. (See advertisement on page 63.)

SUMMER DRESS UNIFORM (White shirt):

5. Hambour & Sons Pty. Ltd. (See entry No. 1.)

BLUE PEAKED CAP (Officers):

6. John Cook & Co. (See entry No. 2)

BLUE WOOLLEN BERETS:

7. Hambour & Sons Pty. Ltd. (See entry No. 1.)
8. John Cook & Co. (See entry No. 2.)

BRIGADE NAME SHOULDER FLASHES, E.F.S. STAR BADGES, etc.:

9. Hambour & Sons Pty. Ltd. (See entry No. 1.)
10. John Cook & Co. (See entry No. 2.)
11. K. A. Ludgate Pty. Ltd. (See entry No. 3.)

FIRE HELMETS (White):

12. Harrison & Crosfield (ANZ) Ltd., 15 Kingston Avenue, Richmond, 5033. Tel. 57 5105. (See advertisements on pages 17 and 35.)
13. Wormald Brothers (S.A.) Pty. Ltd., 191 Torrens Road, Ridleyton, 5008. Tel. 46 0221. (See advertisement on page 47 and inside rear cover.)
14. Torrens Trading Pty. Ltd., 28 Chief Street, Brompton, 5007. Tel. 46 5131.
15. IFSCO Pty. Ltd., 162 Edwards Street, Clarence Gardens, 5034. Tel. 97 3122.
16. Protector Safety Products Pty. Ltd., 1272 South Road, Clovelly Park, 5042. Tel. 76 7377.
17. MSA (Aust.) Pty. Ltd., 187 Sturt Street, Adelaide, 5000. Tel. 51 6484.
18. N.B.L. Trading (SA) Pty. Ltd., 96 Franklin Street, Adelaide, 5000. Tel. 51 7744.

E.F.S. STAR TRANSFERS (Helmet and Vehicle):

19. Harrisons & Crosfield (ANZ) Ltd. (See entry No. 11.)

FIRE CONTROL OFFICER ARMBANDS (Leather):

20. L. W. Hutton & Co. Pty. Ltd., 208 Rundle Street, Adelaide, 5000. Tel. 23 4146.

FIRE CONTROL OFFICER BADGES (Metal Shields):

21. S. Schlank & Co. Pty. Ltd., 17 Chesser Street, Adelaide, 5000. Tel. 23 1235.

E.F.S. BLAZERS and BERMUDA JACKETS (With E.F.S. Star Badge on Pocket):

22. K. A. Ludgate Pty. Ltd. (See entry No. 3.)

E.F.S. TIES and TIE-BARS* (See description on Page 72):

23. Hambour & Sons Pty. Ltd. (See entry No. 1.)

E.F.S. Brigade members requiring any of the above items should contact suppliers direct. Where more than one supplier is shown, it is suggested a price quotation be obtained prior to purchase. Receipts should be obtained to substantiate any Bush Fires Equipment Subsidies claim.

When ordering equipment shown on these pages—please mention the E.F.S. Manual.

V.H.F. COMMUNICATIONS FOR EMERGENCY FIRE SERVICES

The interest displayed in the changeover to very high frequency (V.H.F.) operation of rural fire brigade radio network during the last twelve months has been considerable.

It will be noted, from the list of radio licence holders shown in the Manual, that at this early stage nine progressive services have already changed over to V.H.F. operation.

To assist those services contemplating a changeover from H.F. the P.M.G.'s Department is willing to allow those services at present authorised to exchange emergency messages between their respective base stations on either 2668 Kc/s or 4510 Kc/s to retain the facility until such time that the majority of networks have actually changed to V.H.F. working.

The use of V.H.F. for communication services in emergency fire services will provide superior facilities for the following engineering and practical reasons:—

Relieve the current channel congestion. This congestion is most evident at all times except perhaps during isolated minor fires and is aggravated by long distance characteristics of the present H.F. system.

Sufficient V.H.F. channels can be allotted so that interference between adjacent services is not a problem.

Communication is unaffected by weather or seasonal changes. Not only can V.H.F. operation provide quality, more reliable communications than H.F. for emergency fire service, but can be more effective in combating fires of all magnitudes, from one requiring the resources of a single brigade to one against which resources from the entire region or State are deployed.

This is achieved by the assignment of three frequencies to each network. Two of these frequencies are common throughout the State, while the third channel is employed for local emergency purposes. This plan, therefore, provides three separate communication channels which, if needed, may be used at a fire. In the case of a major outbreak, units from other areas could intercommunicate on two of the channels, while the local vehicles could use the third frequency, thereby affording complete flexibility of operation.

Portable sets of small light-weight construction for operation on V.H.F. frequencies are also now readily available, with outputs of about 1 watt. These sets could be used on the same frequencies as the mobile equipment installed in fire-fighting vehicles and would give an added degree of flexibility for use in areas not accessible to vehicles.

H.F. HAND-PHONE MOBILE SERVICES

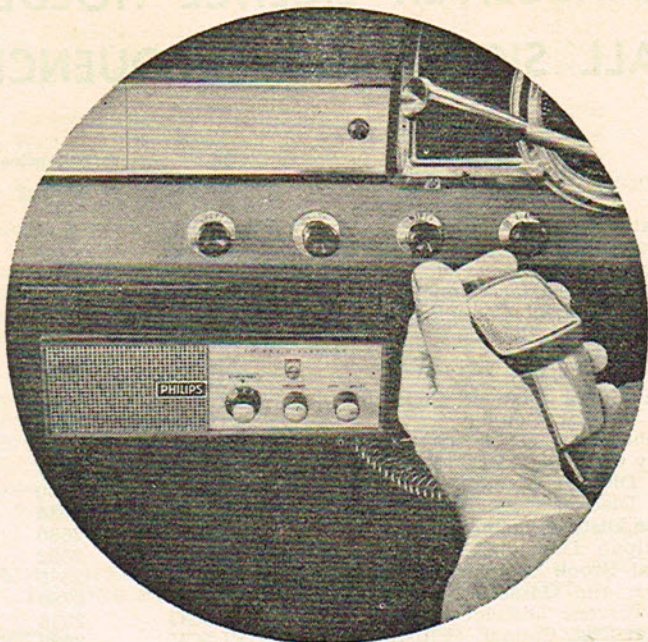
A recent innovation in emergency fire-fighting services communications is the introduction of hand-phone mobile sets in the service. These sets meet the requirement for light-weight portable communication for use in fire front areas inaccessible to vehicles. Hand-phone transceivers operate in the 27 Mc/s band; these units are limited to a maximum power input of 1 watt to the final stage and the use of an aerial which is an integral part of the set.

A frequency in the 27 Mc/s band has been reserved especially for fire-fighting purposes, and any emergency fire service wishing to employ this type of auxiliary communication should make application to the Radio Branch, P.M.G.'s Department, through the Director of Emergency Fire Services, for the necessary licences and frequency allocation.

H.F. HAND-PHONE FREQUENCIES

E.F.S. (Fire only)—27.33 kcs.

"Citizen" Band—27.24 kcs.



Why does the new Philips 2-way radio cost less? Because it's more reliable.

The new Philips 2-way radio is fully transistorised (another "first" for Philips). So it's smaller, more efficient. And its all-solid-state design virtually eliminates all the problems of heat, vibration and battery-drain. Hence less maintenance, greater reliability. It costs only a few cents per day to install and operate. And there are Service Branches throughout Australia. Yet with all these superior features, it's still very competitively priced and guaranteed for one year!

Philips are leaders in telecommunications . . . world-wide.

CALL IN AT YOUR PHILIPS TELECOMMUNICATIONS OFFICE TODAY OR RING NOW.

Mr. THOMPSON — 51 6337
228 FRANKLIN STREET, ADELAIDE



*Philips Telecommunications
of Australia*

Limited

(formerly Telecommunication Company of Australia Pty. Ltd.)
Hendon, South Australia . . . and all States

TRANSCEIVER LICENCE HOLDERS CALL SIGNS AND FREQUENCIES

BODY	Call Sign	Frequencies (Kc's)	
		Normal	Inter-Comm.
Aldgate E.F.S.	VL5GL	2585	
Angaston E.F.S.	VL5BQ	3158	2668
Ardrossan E.F.S.	VL5GM	2780	2668
Balaklava District Council	VL5JB	2660	2668
Barossa District Council	VL5AF	2780	2668
Blyth District Council	VL5DG	2660	2668
Bridgewater E.F.S.	VL5IS	2585	2668
Brinkworth E.F.S.	VL5NB	2660	
Burra Burra District Council	VL5GN	2660	
Bute District Council	VL5JF	2660	2668
Campbelltown E.F.S. (Athelstone)	VL5JX	2836	2668
Cherry Gardens E.F.S. (Meadows D.C.)	VL5LJ	2784	2668
Clare District Council	VL5CG	2660	
Cleve District Council	VL5ME	2585	2668
Clinton District Council	VL5AG	2660	2668
Coonalpyn Downs E.F.S.	VL5EX	2692	
Crystal Brook District Council	VL5DX	2580	
Duncan and Gosse E.F.S.	VL5JZ	2780	
East Torrens District Council	VL5GG	2836	
Elliston Dist. Council (Elliston E.F.S.)	VL5CV	2620	
Elliston District Council (Lock E.F.S.)	VL5MH	2620	
Encounter Bay District Council	VL5FH	2752	
Eudunda District Council	VL5MX	2680	
Farrell Flat E.F.S.	VL5MT	2660	
Franklin Harbour District Council	VL5HC	2620	2668
Georgetown District Council	VL5AB	2580	2668
Gilbert Valley E.F.S. Radio Group	VL5NE	2660	2668
Gladstone District Council	VL5JG	2580	
Gumeracha District Council	VL5GS	2612	2668
Hahndorf Volunteer Fire Brigade	VL5IR	2808	2668
Hallett District Council	VL5LO	2160	2668
Jamestown District Council	VL5FF	2580	
Kadina District Council	VL5JD	2660	
Kanyaka District Council	VL5IN	2580	
Kapunda E.F.S.	VL5FG	2680	2668
Karoonda District Council	VL5MY	163150*	2668
Keyneton District F.F. Brigade	VL5AR	3158	
Kimba District Council	VL5DF	2620	
Lacepede Dist. Council (Kingston)	VL5GK	3158	2668
Laura District Council	VL5HZ	2580	
Lameroo District Council	VL5IZ	2580	
LeHunte District Council	VL5GD	2620	
Lincoln District Council	VL5GZ	2680	
Lower Murray E.F.S. Committee	VL5DH	2692	2668
Lucindale District F.F.A.	VL5JP	3158	2668
Mallala District Council	VL5FZ	2792	
Marion Corporation	VL5BM	163090*	
Meadows District Council	VL5CM	2784	2668
Millicent District Council	VL5IL	163270*	
Minlaton District Council	VL5NP	163090*	
Minnipa E.F.S. Unit	VL5AI	2620	
Mitcham Hills E.F.S. Inc. (Belair, Blackwood, Eden Hills)	VL5BA	163300*	2668

BODY	Call Sign	Frequencies (Kc's)	
		Normal	Inter-Comm.
Mobilong District Council	VL5EW	2620	2668
Mount Barker Volunteer Fire Brigade	VL5AE	2808	2668
Mount Gambier F.F.A.	VL5AM	2808	4510
Mount Pleasant District Council ...	VL5HU	2580	2668
Mudla Wirra E.F.S.	VL5JC	2792	2668
Munno Para District Council	VL5AS	2160	2668
Mylor E.F.S.	VL5IM	2585	2668
Nairne Volunteer Fire Brigade	VL5GF	2808	2668
Naracoorte Bush Fire Fighting Assoc.	VL5BN	2780	2668
Noarlunga District Council	VL5MV	2692	2668
Nuriootpa E.F.S.	VL5GB	2668	
Onkaparinga District Council	VL5AO	2720	2668
Orroroo District Council	VL5IK	2580	
Owen District Council	VL5IW	2792	2668
Peake District F.F.A.	VL5FC	2692	
Penola District Council	VL5CP	2752	
Pinnaroo District Council	VL5IA	2580	2668
Port Elliott District Council	VL5GE	2680	
Port Germein District Council	VL5AC	2580	
Port MacDonnell District Council	VL5AY	2808	
Port Noarlunga/Christies Beach E.F.S.	VL5TB	163090*	

● Continued on page 27

**RADIO OPERATORS! ALWAYS ENGAGE YOUR BRAIN
BEFORE PUTTING YOUR MOUTH INTO MOTION.**

Creamy Smooth
so many deliciously different flavours

AMSCOL ICE CREAM

It's a food not a fad

FARMERS ROADMASTER TWO-WAY RADIO

ALL TYPES OF MOBILE TRANSCEIVERS AND
BASE STATIONS AVAILABLE

Including the new . . .

V.H.F. F.M. Equipment

Models available for E.F.S. use . . .

BRE 165 VHF Base Station 50 watt

BRE 160 VHF Base Station 25 watt

BRE 6 HF Base Station 20 watt

MRT 160A VHF Mobile 25 watt

MRT 9B HF Mobile (illustrated below)



MRT 9B H.F. MOBILE UNIT

Transistorised for
Maximum Economy
and
High Performance.

For complete details contact . . .

FARMERS RADIO PTY. LTD.

257 Angas Street, Adelaide 5000. Phone: 23 1268

RADIO MANUFACTURERS AND COMMUNICATION SPECIALISTS
ESTABLISHED 28 YEARS

BODY	Call Sign	Frequencies (Kc's)	
		Normal	Inter-Comm.
Port Wakefield District Council	VL5IQ	2660	
Prisons Dept., Cadell Training Centre	VL5PP	2692	
Redhill District Council	VL5IV	2580	
Robe District Council	VL5LH	3158	
Salisbury, City of	VL5FS	163270*	
Sedan/Towitta F.F. Brigade	VL5LD	2752	2668
Snowtown District Council	VL5GA	2660	
Spalding District Council	VL5DQ	2660	
Stirling District Council	VL5ES	2585	2668
Stirling Fire Unit	VL5HA	2585	2668
Strathalbyn District Council	VL5CS	2660	2668
Streaky Bay District Council	VL5CT	2620	
Summertown and District E.F.S. Inc.	VL5MG	2836	2668
Tantanoola District Council	VL5AY	2808	
Taplan Emergency Fire Service Brig.	VL5EV	2680	
Tatiara District Council			
Keith	VL5AX	2836	
Bordertown	VL5AZ	2836	
Willalooka	VL5IO	2836	
Western Flat	VL5AW	2836	
Tea Tree Gully E.F.S.	VL5DZ	163270*	
Tumby Bay District Council	VL5LK	2585	2668
Warooka E.F.S.	VL5EZ	163150*	
Watervale E.F.S.	VL5SD	2660	
Wilmington District Council	VL5DL	2580	
Willunga District Council	VL5JY	3158	2668
Yankalilla District Council	VL5GH	2752	
Yeelanna E.F.S.	VL5FV	2680	
Yorke Peninsula District Council	VL5LL	2680	2668
Yorketown District Council	VL5EY	2612	

* Denotes V.H.F. (Very High Frequency)

In addition to the above, the following transceivers are available for transmitting and receiving messages during a fire. The owners of these transceivers have voluntarily made their sets available:

EASTERN DISTRICT FIRE-FIGHTING ASSOCIATION

Operating on the Broken Hill Flying Doctor frequencies of 2020 kc., 4055 kc., and 6920 kc.

Balah	9DB	Oakbank	9EE
Canopus	8ES	Pine Valley	9HE
Morganvale	8UX		

NORTH-EASTERN FIRE-FIGHTING ASSOCIATION

Operating on the Broken Hill Flying Doctor frequencies of 2020 kc., 4055 kc., and 6920 kc., and the Port Augusta Flying Doctor frequencies of 1690 kc., 4010 kc., and 6890 kc.

Radio Traeger 59m. 10 Portable	8SJP (Headquarters).
8SQG; 8SQF; 9SIB	(H.Q. portables).
Mooloolooloo Station	8SEL and 8SHL.
Wiawirra Station	9SS.
Yunta (G. F. Ding)	8TQ.

SOUTHERN AUSTRALIAN PERPETUAL FORESTS LTD (SAPFOR)

Operating on 2792 kc. with inter-base frequencies of 2668 kc., 2660 kc. and 4510 kc. Call sign VH5EE, located at Tarpeena.

WHEN ORDERING EQUIPMENT SHOWN ON THESE PAGES —
PLEASE MENTION THE E.F.S. MANUAL

The "E.F.S. MANUAL" is pleased to publish an exclusive story in verse by a well-known and liked personality in this field, Mr. Max Fatchen.

Mr. Fatchen (or 'Max'—as he is better known) is a Staff Writer and Columnist with "The Advertiser" in Adelaide and is noted for his articles dealing, mainly, with the more human side of our everyday life. His stories have an appealing touch and are often in the true Australian idiom. His main asset is "The Fatchen Humour" which is evident in his thrice-weekly column of verse on a usually topical news story. Even a person in distress cannot fail to smile at a typical verse by Max.

In addition to his literary prowess, Mr. Fatchen has strong ties with the Emergency Fire Services, being a member and Patron of the Smithfield E.F.S. Brigade, some 18 miles north of Adelaide.

—EDITOR.

"READY, WILLING AND ABLE"

*There's the wailing of a siren. There's the thud of rubber boots.
There's a revving of the engine and a buttoning of suits.
They go running for the station like a pack of startled hares
And they clamber up like monkeys . . . and away the unit tears.*

*There's a rubbish fire that smoulders. There's a bin that's bright
with flames.
There's some coot who burnt his carpet (and for him we've got
some names)
And it needs much understanding and a ton of tact and charm
When the boys turn out for action and it's just a false alarm.*

*When the wind comes like a furnace and the flames come like a
wave,
Then it's grim and deadly earnest as a house you try to save.
When the bushfire like a torrent sweeps across the tinder land
And the trees go off like rockets and your throat's as dry as sand.*

*There's a weary truck returning with its grimy, hard-worked hose.
There are fellows short of eyebrows and with soot upon the nose.
If you want to toast their valor (and they're not the blokes to
brag)
There's some "champagne" from the Murray in the unit waterbag.*

*In a certain nether region where the flames will daily blast,
There's a fellow with a pitch-fork and an eye of anxious cast,
"Keep on stoking, fellow demons, for we're in a proper mess
If they ever bring those units and the ruddy EFS."*

—Max Fatchen.

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COMMONWEALTH BUREAU OF METEOROLOGY.

KNOW YOUR METEOROLOGICAL TERMS

FINE—No precipitation. May be cloudy or windy.

SHOWERS—Falls separated by clearing, and sometimes sunny, periods. May vary from a few points to over an inch.

RAIN—Falls from dense layer clouds. Usually more continuous than showers, although may be intermittent without skies clearing. Not necessarily heavy nor general.

DRIZZLE—Falls from low stratus type cloud, the base of which is generally below or slightly above surrounding hills or ranges. Is composed of small droplets which do not usually register more than a few points.

ATMOSPHERIC PRESSURE—Weight of the atmosphere above a given point on the earth's surface. Usually measured by a barometer in inches of mercury or millibars.
30.00 inches is approximately 1016 mbs. or
29.50 inches is approximately 1000 mbs.

ISOBARS—A line joining places of equal barometric pressure. All pressures are reduced to Mean Sea Level for comparison.

HIGH PRESSURE SYSTEM (Anticyclone)—The highest pressures are in the centre of the system and the winds flow anticlockwise around the centre.

RIDGE—An elongated area of relatively high pressure about which the winds flow anticlockwise and isobars are not usually closed.

LOW PRESSURE SYSTEM—The lowest pressures are in the centre of the system and winds flow clockwise around the centre.

TROUGH—An elongated area of relatively low pressure about which the winds flow clockwise and isobars are not usually closed as in a cyclone.

CYCLONE—A low pressure system in which the central pressure is usually very low and the winds usually very strong.

PRESSURE GRADIENT—This is measured by the distances apart of the isobars. The closer the isobars the stronger the winds and vice versa.

RELATIVE HUMIDITY—Amount of water vapour in the air at a given temperature compared with the amount which the air could hold if saturated.
60% Relative Humidity means only 60% saturated.

DEW POINT—The temperature to which air at a given temperature and relative humidity would have to be cooled to cause saturation. Air at 70° F. and relative humidity 50% would become saturated if called to 50° F.

COLD FRONT—When cold air, usually from the west or southwest, undercuts warm air from the north to northwest, the line between the cold and warm air is a cold front. Shower activity often results.

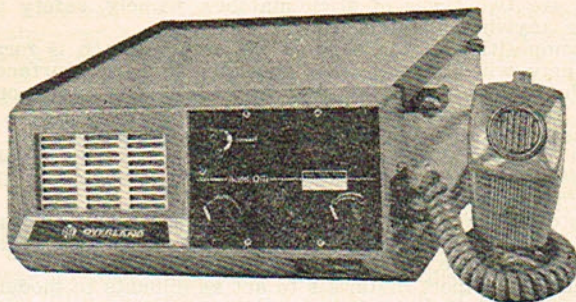
WARM FRONT—When warmer NE to NW air flows over cooler E to SE air, the line between the warm and cold air is a warm front. Rain frequently occurs.

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MATCHES AND THEIR HAZARDS

Extract from the "Fire Protection Association Journal,"
(U.K.) of December, 1964.

Matches used in the United Kingdom are mostly stick matches contained in wooden boxes. Other types, such as book matches, occupy only a small part of the total match consumption. The new British Standard B.S. 3795—"Specification for Matches", covers both stick and book matches.

There are two types of stick matches, namely, safety matches and 'strike anywhere' matches.

The composition of the head of the safety match is formulated to ignite only when struck on a specially prepared surface, while that of the 'strike anywhere' will ignite on most hard or rough surfaces.

The head contains five main types of ingredient:

1. An easily-ignitable material which is usually sulphur for safety matches and tetraphosphorus trisulphide in the case of 'strike anywhere' matches.
2. An oxidising agent which is usually potassium chlorate with or without a small quantity of manganese dioxide to facilitate oxygen release.
3. Chemically inert materials to act as diluents to moderate the violence of the reaction between the two above-mentioned materials and also to increase the frictional effect obtained on striking. To this end, materials such as powdered glass, plaster of Paris, zinc oxide, asbestos powder and other inert materials may be incorporated in the formulation.
4. Colouring matter which is used to add a distinctive feature and especially to distinguish between the safety and the 'strike anywhere' types.
5. Glue or gum arabic to bind the head and hold it onto the stick.

Tetraphosphorus trisulphide mixed with an oxidising agent ignites at a lower temperature than a mixture of sulphur and an oxidising agent, and this is the essential difference between 'strike anywhere' and safety matches. The temperature of ignition of the former can easily be attained by frictional heat, but in order to ignite the safety match, a special igniting surface must be used, consisting of a layer of so-called friction paint. The friction paint contains red phosphorus together with powdered glass, antimony sulphide and chalk in a binding medium of glue or gum. Ignition is brought about when the phosphorus on the strip is brought into contact with the oxidising agent in the match head.

Although by their nature and function matches must possess some fire hazard which cannot be eliminated, faults can also occur in manufacture which aggravate the hazard. Some of these faults are associated with stick, some with the head, and occasionally with the containing box.

Afterglow is a hazard and is usually suppressed by impregnating the splint of the match with ammonium phosphate. If impregnation is not carried out successfully, the resulting match will glow after the flame has been extinguished.

Splints which break due to an imperfection in the wood or the use of a very thin splint are undesirable, as they may allow the burning head to fall on combustible material and cause a fire.

Heads which drop hot ash while burning are also undesirable. This may be due to lack of cohesion, or a distorted or fractured head.

Some matches will 'shoot' or explode when ignited due to an imbalance in the composition.

Occasionally double matches are made. These comprise two matches joined at the head by a bridge of composition.

● Continued next page

RATS AS FIRE STARTERS

(Extract from the December, 1967 edition of the "Fire Protection Association Journal.")

Another, and a rather off-beat problem for fire preventionist—rats! Cases have recently been reported of various types of electric cable being gnawed by rats, with obvious fire risks. Rubber and plastic-insulated as well as lead-sheathed cables have all been attacked.

The likes and dislikes of rats in this context have been studied in laboratory experiments, and a confused behaviour pattern emerges. Rats sometimes use the insulation for nesting material; they gnaw a cable if it obstructs their run; there is a good deal of evidence that rats gnaw anything suitable to sharpen their teeth; there is little evidence that rats eat the insulation, but a rat may damage a cable (in farm buildings, for example) when eating food deposited on the cable.

In a number of incidents, peculiarities of taste have been observed. Rats recently gnawed many yards of a p.v.c.-sheathed cable in a thatched cottage, showing far greater preference for the grey sheath than for the black and red insulation for the conductors. There was no readily apparent reason for this preference, because there was little difference in the composition of the plastics. In a cable tunnel, many yards of p.v.c.-sheathed cable was attacked and an adjacent tough rubber-sheathed cable ignored, whereas a hundred yards along the tunnel the attack was reversed and though the T.R.S. cable was severely gnawed, the p.v.c. cable was untouched.

Precautions are needed to protect electric cables where rats are known to be present. Cables made with rat-repellent plastic could be produced, but the cost would be extremely high. In any case, while reducing the scale of attack, they do not confer complete immunity from attack, nor does the repellent property last indefinitely. The repellent is gradually lost from the plastic and becomes ineffective in 5-20 years.

If the rats in a building cannot be exterminated, the most effective protection that can be given to cables is either to install them in steel conduit or to use mineral-insulated metal-sheathed cable.

● MATCHES AND THEIR HAZARDS (Continued)

It is essential that matches do not ignite at easily attained temperatures, such as those of hot water pipes and low pressure steam pipes, or from the heat generated by slight friction. Thus, it is considered desirable that safety matches should not ignite if subjected to a temperature of 170 degrees C. (370 degrees F.) for less than ten minutes. For 'strike anywhere' matches a minimum ignition temperature of 140 degrees C. (284 degrees F.) is considered necessary.

It is also important that the friction paint does not appear on the inside of a box near the match, as such circumstances may lead to ignition of the matches while they are being carried.

Although it is impossible to test for these faults in every match that is produced, it is hoped by careful sampling and testing to ensure that such faults are kept to an irreducible minimum before matches are offered to the customer.

(EDITOR—In South Australia, Section 78(1) of the Bush Fires Act, 1960, states, "A person shall not sell, offer for sale, distribute or use matches the heads of which contain phosphorus or a sulphide of phosphorus. Penalty of \$50.")

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1949—Mount Barker	83.5	*1960—Nuriootpa	82.7
1950—Belair	84.5	1961—Clare	101.1
1951—Mount Barker	86.5	1962—Cellulose	94.2
1952—Nangwarry	80.0	1963—Clare	97.9
1953—Nangwarry	81.8	1964—Mount Barker	92.1
1954—Nangwarry	84.2	1965—Clare	82.9
1955—Nangwarry	86.7	1966—Yorketown	87.8
*1956—Cellulose	72.3	1967—Nuriootpa	84.6
1957—Clare	79.3		

* No water in trailer Pump Drill, due to wet conditions.

** No third movement in Dry Drill, and no water in Trailer Pump Drill, wet conditions.

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1953—Montacute	39.0	1962—Montacute No. 1	40.0
1954—Woodside	38.5	1963—Cherryville	35.0
1955—Woodside A	35.0	1964—Montacute No. 1	39.0
1956—Montacute B	36.0	1965—Stirling No. 1	36.4
1957—Woodside No. 1	32.2	1966—Yorketown	35.0
*1958—Montacute	29.0	1967—Yorketown	35.0

* No vehicle movement. Wet conditions.

BEST AND MOST EFFICIENT APPLIANCE AND CREW

1958—Mount Barker	1962—Eden Hills	1965—Yorketown
1959—Mount Barker	1963—Eden Hills	1966—Kimba
1960—Nuriootpa	1964—Eden Hills	1967—Two Wells
1961—Mount Barker		

INDUSTRIAL FIRE SERVICES, Inc. v. E.F.S. (Dry Hose Drill)

	Secs.		Secs.
1960—Jamestown E.F.S.	65.0	1964—G.M.-H. (Elizabeth)	58.0
I.C.I. Ltd.	77.2	Mt. Barker E.F.S.	62.4
1961—I.C.I. Ltd.	62.2	1965—BALM Paints Ltd.	61.6
Clare E.F.S.	63.7	Clare E.F.S.	65.8
1962—Cellulose E.F.S.	69.2	1966—Nuriootpa E.F.S.	66.0
B.T.M. Ltd.	70.2	G.M.-H. (Elizabeth)	68.0
1963—Mt. Barker E.F.S.	63.4	1967—Nuriootpa E.F.S.	58.6
I.C.I. Ltd.	65.0	G.M.-H. (Elizabeth)	63.0

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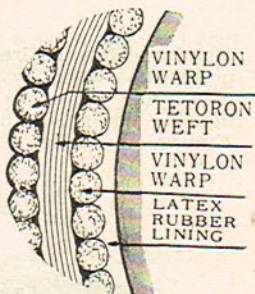
:: 1965 ::			:: 1966 ::		
Division	Brigade	Region	Division	Brigade	Region
1st	Cadell	7	1st	Nuriootpa	2
2nd	Yorketown	3	2nd	Mount Barker	1
3rd	Elliston	6	3rd	Barmera	7
:: 1967 ::					
Division	Brigade	Region			
1st	Koolunga	4			
2nd	Cellulose	5			
3rd	Eden Hills	1			

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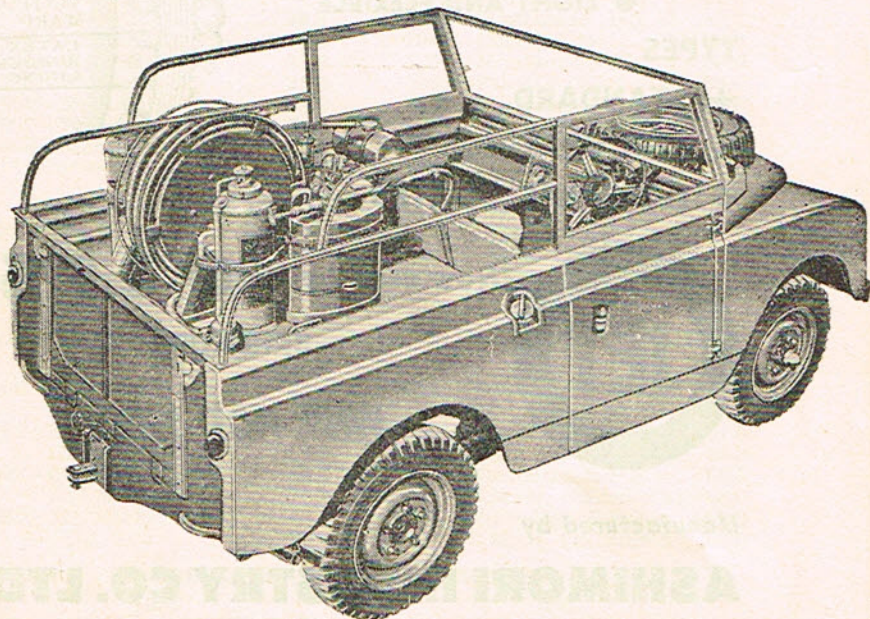
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A SUMMARY AND EXPLANATION OF THE RULES FOR LIGHTING FIRES IN THE OPEN AIR

F. L. Kerr, Director, S.A. Emergency Fire Service.

The S.A. Bush Fires Act 1960 was framed "to provide for the prevention and control of bush fires and other fires, to repeal the Bush Fires Act 1933-57—and for other purposes."

The provisions of the Act apply throughout the whole of the State with the exception of matters relating to the registration and functions of fire fighting organisations and certain powers of fire control officers. City and metropolitan area dwellers are equally bound with their rural cousins to heed the "fire ban" broadcasts and other Act rules concerning the lighting of fires in the open, burning of grass or scrub, etc.

The Act is divided into four parts and is supplemented by Regulations. A summary of the various parts and provisions of most general interest, together with a useful index, form an appendix to this paper. Anyone who wishes to make a serious study of the Act should refer to the Act in full. Copies of the Act and Regulations (there are no amendments at the time of writing), may be obtained from the Government Printer, King William Road, Adelaide, 5000.

The responsible Minister for the Act is the Minister of Agriculture. The Minister has the assistance of the Bushfires Advisory Committee which comprises of nine members. Four members are Government Departmental Officers and five are honorary representatives of country districts. This committee advises the Minister on the administration of the Act, investigates and reports on methods of bushfire prevention and extinction.

Bushfires Act legislation throughout Australia, although similar in principle, varies to some extent in the various States. There would be decided advantages to be gained if as many provisions as practicable in each State were common.

Prescribed danger periods and rules for burning off and lighting fires in the open air have been laid down to enable fire to be used productively with a minimum of risk.

Widely divergent hazards and seasonal conditions throughout South Australia preclude a simple common code. Basic rules have been written which are subject to variation by local authorities. For example, the Act, in Sections 38 and 39, sets down the "Prohibited" and "Conditional" burning periods from 1st November to 15th February and from 16th February to 30th April, respectively. These periods are the average danger seasons. The dates apply throughout South Australia unless altered by local authorities. These changes can be of a permanent nature with permission of the Minister (S.40) or for seasonal variations (S.41), by Council resolution.

The terms "Prohibited" and "Conditional" are used in the Act because they have become accepted by rural communities to identify the period when the burning of scrub is prohibited (S.52)—(most dangerous period), and the period when the burning of scrub is permitted (S.53), subject to certain conditions (S.54). Standing stubble (grass and such light fuels), may be burnt during the prohibited period (S.44) only for fire breaks and subject to restrictive precautions, and during the conditional period (S.48) for any reason subject to general rule (S.49).

Councils may exempt some of the rules for the burning of scrub and stubble (Ss 50, 56, 57), to enable expeditious and easier burning when fuel and weather conditions permit.

As a safeguard against fires escaping through relaxed conditions or other reasons, any fire control officer who considers a fire

is reasonably likely to get out of control may direct the person who lit the fire, or occupier of the land, to extinguish the fire (S.89).

"Fire Control Officers" are the persons authorised under the Act to take charge of fire fighting operations. The office is honorary and appointments are made by local governing bodies or the Minister. Fire control officers are given wide powers to enable them to take any appropriate action in the control and extinguishment of fires. These powers are mostly set out in S.86, with the addition of certain miscellaneous powers under other sections.

The responsibility for fire protection and fire fighting in those areas outside of scheduled districts of the S.A. Fire Brigades Act is vested in the local governing bodies (District & Corporation Councils), see Ss. 28, 82, 83; Regulations 5, 6 and 7.

RULES FOR BURNING OFF SCRUB OR STUBBLE:

The "burning off" of scrub or stubble is acknowledged a more hazardous action than the lighting of barbecue, camp fire, or heap of rubbish. The general rules for burning standing stubble and scrub are set in Ss. 48, 49, 52, 53 and 54, respectively. These rules are of a much more stringent nature than the precautions laid down for the lighting of a campfire, rubbish fire, etc.

Scrub, is defined as—"scrub" means trees, bushes and underwood of all kinds and sizes, whether alive or dead, and whether standing or not standing, and any parts of trees, bushes or underwood whether severed or not severed, but does not include trees of such kinds or sizes as the Governor, by proclamation, declares not to be scrub within the meaning of this Act."

Stubble is defined as—"stubble" means stubble, hay, straw, grass and herbage whether alive or dead, and whether standing or not standing."

The word "standing" although used significantly in the Act, is not defined. It seems to me that the word "standing" as used in the Act is compatible with the sections in which it is used when we apply the basic or "Literal Rule" of interpretation, and accept the word to mean "uncut" (Oxford dictionary "Standing corn—not cut").

The sections in the Act which relate to fires other than the "burning off" of scrub or standing stubble are set down under the heading of "Restriction on certain fires in the open air" in Part III commencing at S.61.—It is under this heading that we find the rules which deal with the lighting and maintaining of barbecues, camp fires, rubbish fires—i.e., "fires in the open air" other than "burning off" fires.

The basic rules which apply to "fires in the open air" require that a space immediately around the fire of at least 12 feet wide (radius) is clear of all inflammable stubble, scrub and other material. The fire shall not be left unattended. It must be completely extinguished before leaving (S.62).

Remember that these rules, as with the rules for burning off, apply throughout the whole of South Australia during the prohibited and conditional periods, as laid down in the Act or during the periods as varied by the local governing authority (Council).

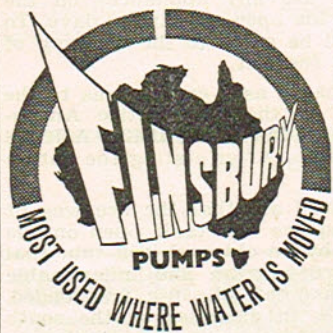
"FIRE BANS"—(Ministerial)—(S.65):

The Minister may broadcast or authorise any person to broadcast a warning that the day is a day of serious fire risk and that the lighting and maintaining of fires in the open air for any purpose whatsoever is prohibited throughout the whole State or specified part of the State.

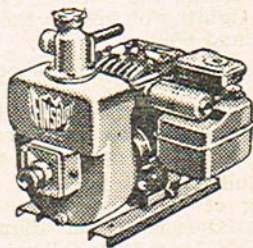
The State is divided into ten (10) Meteorological Districts for fire danger forecasting and warnings. Maps of the districts are available through the Department of Agriculture or Meteorological Department. For a written description of the boundaries refer to the S.A. Government Gazettes 16/2/56 and 14/1/60.

● Continued on page 42

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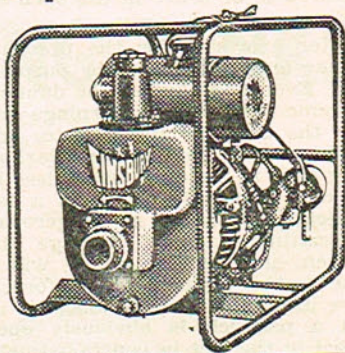
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Once the official broadcast of a "ban" is made it becomes the law. The onus is on the person who lights or maintains a fire to ensure that he does not contravene the law. It is unwise to make one's own forecast—listen for the broadcast or contact the Bureau of Meteorology—DON'T GUESS—nothing takes the flavour out of the barbecued chop more than the heavy hand of the law.

Local Government Councils may, by resolution under S.61 of the Act, prohibit the lighting or maintaining of fires in the open air in their districts for periods, and under specified circumstances. Councils may also make by-laws under the Local Government Act for the prevention, suppression and speedy extinguishment of fires, for preventing the burning of offensive substances and for prohibiting the lighting of fires in the open air—(see Local Government Act, Ss. 667 and 669).

The question often asked by persons who wish to use barbecues or incinerators is whether there are any appliances on the market which can be lighted legally in the open on banned days. To answer this question consideration must be given to the meaning of the words "in the open air" as used in the Act.

A judicial interpretation which is based as a criterion as to the meaning of "open air" was delivered by the late Justice Angas-Parsons (Opie vs Mount—Supreme Court—May 7-15, 1942). ANGAS PARSONS J. read the following judgment: (After stating the nature of the matter His Honour continued):—

"The facts found, proved, or admitted are that the fire was lit by an employee of the defendant in a square iron tank, open on one side, which side was partially shielded by an old oval iron tub; that the defendant had neglected to clear dry grass and inflammable material from around the tank, and had left the fire unattended. The tank had a small hole three inches in diameter on the south side, and was partly open on top, and the fire was lit in the tank in a paddock."

The question submitted is whether a fire so lit could be considered to be a fire in the open air or not.

The purpose of the Act is stated thus: It is "an Act to make better provision for the prevention and control of bush fires and other fires and for other purposes."

Everybody knows the danger of bush fires in the hot Australian summer, but certain burnings must be done, and they are permitted by the Sections referred to, and with the precautions prescribed. Subject to them, however, Parliament recognises the danger of lighting fires in the open air, unless the precautions indicated in S.13 are taken. Probably a fire in a tank such as that prescribed in the special case is not so dangerous as a fire lit on the ground. Some precautions against damage through fire appears to have been taken, and that, no doubt, will be recognised by the justices when the matter again comes before them. But I have no doubt that a fire in a tank, in a paddock, is a fire used in the open air. **The air in a paddock is obviously open, and the words "open air" are used in the Act in contradistinction to the air in a place where it is confined, such as in a house, or any closed-in-structure.**

Mr. Litchfield, as amicus curiae, contended that wherever a fire was protected, not necessarily absolutely or perfectly, it was not a fire entirely in the open air. Alternatively, he said the matter should be resolved according to the degree of protection. I am indebted to Mr. Litchfield for his assistance notwithstanding that I feel bound to reject his contentions. "Open air" means what it says, and it is opposed to what would be described as air which is not open, but is confined. It would defeat the manifest intention of Parliament to say that a dangerous fire used in the circumstances described in the case, was not a fire in the open air. **A fire is no less**

a fire in slight protection such as from surrounding bricks, or is in a tin or tank. The Act does not deal with the vessel in which the fire is lit, but strikes at its being lit outside, i.e. out of doors, or, in the open air.

The case should be answered in the affirmative and remitted to the Court of Summary Jurisdiction.

It will be seen that a lighted barbecue or incinerator would need to be situated within an adequately closed-in structure where the air was confined and sparks could not be flung into the open air, if the spirit of Justice Angas Parsons' judgment were to be met.

The minimum dimensions of an adequate "closed-in structure" or approved design of barbecue or incinerator are not defined by law. All of the circumstances under which a fire had been lighted would need to be taken into consideration in any court action. It would be imprudent to light a fire in any reputedly "safe" appliance, out of doors, without legal assurance that the law was not being broken.

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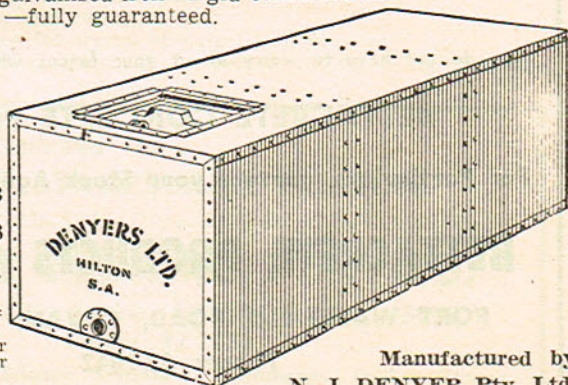
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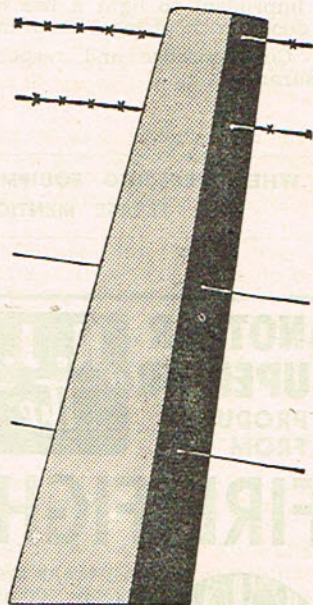
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Courtesy of the National Safety Council of Australia and the Australian Fire Protection Association.

The cry of "Fire!" is nowhere more terrifying than at sea, because the occupants of any vessel, ranging in size from the greatest liner to the smallest pleasure boat, realise that they are cut off from outside help, and if the fire cannot be extinguished promptly, the lives of all on board may be endangered. On big ships there have been many tragedies through fire at sea.

The small pleasure boat is not exempt from the danger of fire, and the world-wide boom in the use of such craft has drawn attention to the problem of safety to life in small boats of this kind.

The key-note for a successful and happy outing on the water is 'common sense' and the following check list, if used diligently each time, should ensure this.

- Clean engine
- Clean bilge.
- No "weeping" joints or taps in fuel lines.
- L.P. Gas cylinder installed in accordance with Regulations, or as recommended by competent authority.
- Spare petrol in proper containers.
- Flame arrester fitted to carburettor.
- Electric wiring in good condition.
- Battery secured and terminals covered.
- Main switch for battery.
- Oily rags in proper container with lid.
- Fire extinguisher—filled, operative and accessible.
- Alternative extinguisher (or bucket of dry sand) and bucket on a rope.

TEN COMMANDMENTS FOR REFUELING OF SMALL BOATS

1. Put all passengers ashore.
2. Close all hatches, etc., to prevent fumes which are heavier than air from entering the hull and lying in bilges, etc.
3. Put out all cigarettes, pipes, sparks.
4. Turn off the pilot light of a gas refrigerator.
5. Cut off electric power at the main switch.
6. Maintain contact between the hose nozzle and the filler pipe to prevent the moving petrol from generating static sparks.
7. Carefully clean up all spilled fuel.
8. Open all hatches and ventilate boat.
9. Sniff in the bilges for traces of petrol fumes.
10. When satisfied that the boat is free of fumes, bring the passengers aboard.

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GENERAL INFORMATION ON MAPS

Up to date maps are an essential accessory to efficient bushfire control.

E.F.S. Control Centres and field officers have the need for maps of various scales covering a variety of features. Small scale maps are necessary to give a picture of the whole district and neighbours—large scale maps are required for field use and detailed features.

A better variety of maps is available to districts in the more closely settled areas which have been mapped in both large and small scales.

E.F.S. Headquarters Staff has established liaison with the Department of the Army (Royal Australian Survey Corps), Department of Lands, Mines Department and other offices to keep abreast with current map publications and progress of mapping within the State.

The majority of maps of South Australia have been compiled from information obtained from surveys by the three Departments mentioned above. Many have already been published and several are in the final preparation process, prior to printing.

A fourth mapping agency at work in Australia is the Division of National Mapping, a branch of the Commonwealth Department of National Development.

Their main mapping activities are directed towards the production of small scale mapping, covering large areas of the Continent.

All air photography, field survey and mapping activities carried out in Australia are co-ordinated and standardised by the National Mapping Council of Australia. The Council is comprised of representatives from all State and Commonwealth Government Mapping authorities in Australia.

There are five different types of maps and these have been classified into the following categories: (1) Topographic series; (2) Planimetric Series; (3) World Aeronautical Charts (I.C.A.O.); (4) Australian Geographical Series; (5) Miscellaneous Maps.

The categories of particular interest to E.F.S. Brigades are (1) Topographic (contoured) and (2) Planimetric (uncontoured).

Topographic Series Maps are available in various scales. They are compiled from aerial photographs which are co-ordinated to ground surveys and show cultural detail, drainage systems and relief of terrain to specified standards of accuracy. In some instances, vegetation and cadastral information may also be included. Relief is represented by means of contours and, on small scale maps, hypsometric tinting may also be added.

Details of maps in this Series are as follows:—

SCALE	Contour interval (feet)
1:253,440 (4.00 miles to 1 inch) (small scale)	250
1:250,000 (3.95 " " " ")	250
1:100,000 (1.58 " " " ")	100
1:63,360 (1.00 " " " ") (large scale)	50
1:50,000 (0.79 " " " ")	50
1:31,680 (0.50 " " " ")	50
1:25,000 (0.40 " " " ")	25

The above maps are produced on the Transverse Mercator Projection and are a multi-coloured publication.

Planimetric Series Maps show the horizontal position of all cultural features, drainage systems and, in some instances, vegetation. Some indication of relief may be obtained by means of spot heights supplemented by hachuring or hill shading. This series is produced at scales of 1:253,440 and 1:250,000, on a Transverse Mercator Projection in a monochrome or multi-coloured presentation. They are also compiled from air photographs which are co-ordinated to ground surveys.

(N.B.—Since 1960, Commonwealth mapping agencies have abandoned mapping at scales of 1:253,440 (4 miles to the inch) and

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1:63,360 (1 mile to the inch) in favour of the scales of 1:250,000 and 1:50,000 (known as "Metric Scale" maps). However, several State Government Departments still issue maps in the scale of 1:63,360, as well as other larger scale maps.)

Air Photography plays a vital part in map making and the whole of South Australia has been photographed from the air by both Commonwealth and State Government mapping agencies. Scale of this photography varies from 1:24,000 to 1:85,000 and is flown in units of 1:63,360 maps areas for medium and large scale mapping whilst for small scale mapping, the unit is the 1:250,000 map area. When several air photos are joined together to form one map of a particular area, they are known as 'mosaic maps'. The S.A. Department of Lands can supply air photos of most parts of the State at a small cost. Contour lines are not drawn on these prints.

Photomaps fall into two categories: uncontrolled and controlled. The former is an assemblage of unrectified air photographs which are matched together to form a continuous photographic (or mosaic) representation of an area. In this category, scale and direction may be inaccurate to a marked degree, depending upon quality of air photography and difference in height of terrain. Maps in the photomap series are published at various scales and generally conform to the same boundaries at the topographic map of the same scale.

SALE OF MAPS:

The majority of printed maps, air photographs and photomaps of South Australia are available for purchase by E.F.S. Brigades from the following authorised agents or Government Departments. Price of maps is normally 50c per copy, with prices for air photographs and photomaps slightly higher, depending upon the size and availability.

Should a copy or print not be readily available arrangements can be made with the agent or Department to obtain copies, providing there is a publication of the particular area required.

Authorised Agents in South Australia:

Boy Scouts' Association of S.A., 119 Pirie Street, Adelaide, 5000.

Sands & McDougall Ltd., 64 King William Street, Adelaide, 5000.

Da Costa Books, 68 Grenfell Street, Adelaide, 5000.

Royal Automobile Association, Hindmarsh Square, Adelaide, 5000.

Maps, Air Photographs, Photomaps—available from State Government Depts.:

Department of Lands, Treasury Building, Flinders St., Adelaide, 5000.

Department of Mines, 169 Rundle Street, Adelaide, 5000.

CARE OF MAPS:

A map is a valuable document and is normally printed on a good quality paper. Some copies are occasionally printed on linen. The face of a map is easily damaged if care is not taken to fold it in a correct manner. Maps should not be folded unduly, neither should they be permitted to get wet. Marks should not be made on the map directly, but on a transparent overlay by the means of special coloured Omnicrome or Chinagraph pencils. E.F.S. Headquarters Staff would be pleased to advise on the care of maps.

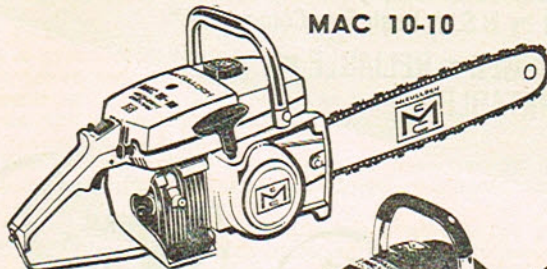
MAP READING:

No particular skill is required in 'reading' a standard map but elementary training is required in order to interpret the various signs and symbols used to denote certain features—both natural and man-made. E.F.S. Headquarters is able to supply a printed training circular called "Elementary Map Reading," upon request. Several books are available for purchase for the more advanced student in this field. These are obtainable from most bookshops.

When map reading training is carried out it is easier if the whole class uses copies of the same map in conjunction with a lecture. Training should not be confined to the classroom but when students are more proficient, field exercises should be conducted, both in the town and broadacres.

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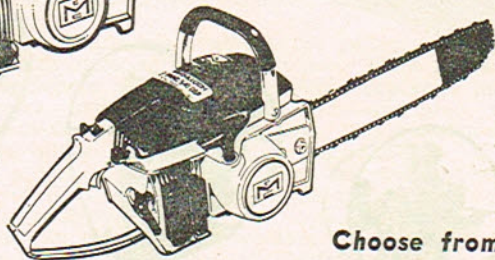


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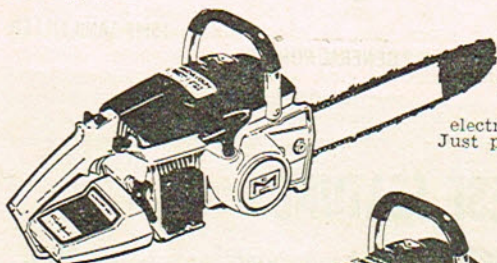
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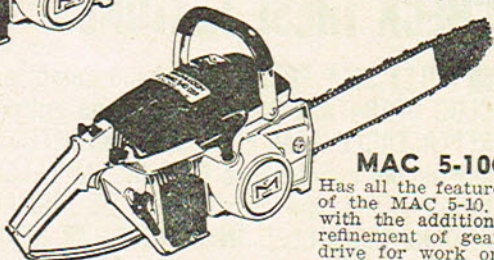
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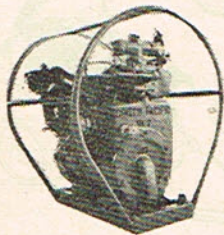
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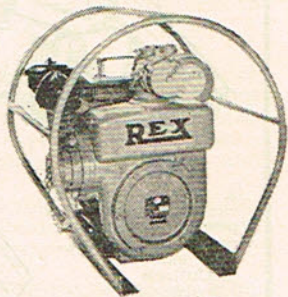
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* Approved by N.S.W. Bush Fire Committee

FIRE AND THE RURAL HOMESTEAD

By K. W. E. VEAR

District Forester, Woods & Forests Department of S.A.

Action which can be taken by the householder as a fire out of control approaches the homestead.

For the people living in the house the issue is clear—they wish to preserve their lives, to protect themselves from bodily harm and to preserve their personal possession from damage. These responsibilities clearly outweigh any responsibility towards the fire at large, which presumably is being tackled by a number of other people who are not so personally or immediately involved at this time.

In the face of an approaching fire little time for action remains and a great deal depends upon precautionary measures which have been taken beforehand (as recommended by the Bush Fire Research Committee). The few minutes remaining can be used to best advantage by carrying out as many as possible of the following commonsense actions:—

1. Seal the house as effectively as possible against the entry of burning material—close all doors, windows, screen doors and venetian blinds.
2. Make ready whatever means are available for extinguishing any burning material which gains entry to the house. Place knapsack spray or fire extinguishers ready for use. Fill receptacles inside the house with water—sink, troughs, bath, etc.—and place pots or buckets at hand ready for throwing water. If a suitable step ladder is available, place it ready under the man-hole in the ceiling and place a bucket of water within the roof space—to provide a means of dealing with any burning material which gains entry to the roof space.
3. **Safety precautions.** In case fire suppression measures have to be undertaken inside the house, turn off electricity at the main unless it is required for pumping water. If children or invalids are present assemble them in one room with easy access to the outside, preferably under the supervision of an adult. Take woollen blankets off beds and distribute them, wet if possible, amongst persons present to be used if at any stage it becomes necessary to escape through flames. Advise E.F.S. base or some responsible person how many people are in the house and whether or not their lives will be endangered as the fire passes. It is as important to inform the fire control authority that no lives are in danger as it is to call for help when there is a threat to life. By so doing you may prevent fire control personnel from risking their lives needlessly. The house should be the final haven to be used for protection of life if conditions outside become intolerable, and even if eventually destroyed should provide a refuge during the relatively few minutes that conditions outside are made insupportable by the passing bush fire.
4. **Outside preparations.** Connect garden hoses to taps to reach as much as possible of the exterior of the house. If possible fill roof gutterings by plugging down pipes with tennis balls, rags etc. Toss any flammable matter a few feet away from the walls of the house—mats, bags, firewood, verandah furniture, etc. If an extension ladder is available place it ready for quick access to the roof, together with a pinch bar to remove roofing iron if necessary.
5. **Outbuildings.** Close shed doors and windows and seal fuel drums. Drive vehicles, tractors and implements into a clear space or roadway away from buildings or hedges. Close vehicle doors and windows.

● Continued on page 52

As the fire approaches, patrol the exterior of the house with hoses, knapsack spray, fire extinguisher or a bucket of water. Pay particular attention to eaves, gutterings, roof openings and under floor spaces. Continue this until all danger of the house igniting has passed.

If conditions outside become intolerable, retreat inside the house with doors closed until it is possible to return outside to resume patrolling. If during the time that refuge is taken inside, the house is ignited beyond control, assemble persons present in a room with an exterior door or window on the least dangerous side. Ensure that each is thoroughly covered including face and arms, preferably with wool such as a blanket, wet if possible. Instruct everyone present where to proceed outside, for example to the middle of the lawn or the middle of the yard between house and sheds. Try to judge when conditions outside have moderated somewhat. Open the door and proceed to the selected assembly point, keeping well covered. If conditions outside are still difficult, lie face downwards covered with the blanket.

As soon as possible, again make contact with the fire control authorities and advise them of the situation in regard to the people present—whether all are unharmed or whether medical help is required.

If there is opportunity to rescue some property from a house which is about to be destroyed by fire it is suggested that the T.V., lounge suite and refrigerator be left to take their chances—the most valuable items are business, insurance and personal records and photographs, followed by family heirlooms and items of historic value. Remember that in no circumstances is it justifiable to endanger life in an attempt to save property—no matter how valuable the property. The only case where risk to life can be warranted is where there is a possibility of saving life.

Problems facing the Fire Control Officer as a fire out of control approaches a homestead

The responsibility of the Fire Control Officer is to use the resources which are available to him, first of all to protect the lives of any persons endangered by the fire and secondly, to bring the fire under control in such a way that the minimum possible damage to property will result.

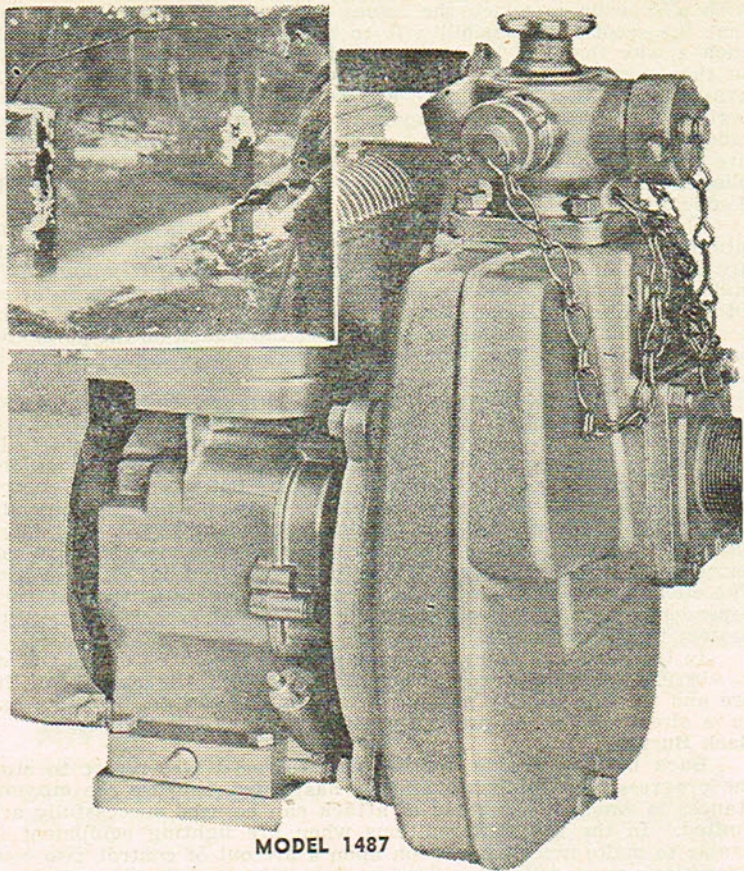
Therefore his first duty, as a fire approaches a homestead, is to find out whether any lives are endangered. If this information is not available by radio from base or other reliable source he must investigate, either personally or by despatching a reliable person who will report back to him, preferably by radio. This may mean detaching a radio-equipped vehicle from the fire-fighting operation—because this investigation has higher priority than continuing work on the perimeter of the fire. The further actions of the Fire Control Officer will be determined by the information he receives about persons who are in the path of the fire. He must satisfy himself that adequate protection has been provided for these persons. If necessary he will have to detach fire-fighting forces from the attack on the main fire—the extent to which this will be necessary will depend upon conditions at the homestead.

Should evacuation of residents be essential, it is preferable this duty be carried out by the police, if readily available. It is a police function to care for the safety of civilians during a disaster and co-operation between the police and fire controllers would prevent repetition of enquiring into properties in possible danger. When police are carrying out evacuation, this leaves fire controllers free to concentrate on fire suppression activities.

"The Fire Control Officer's Dilemma"

If the Fire Control Officer is satisfied that no persons are endangered as the fire approaches a homestead he may be faced

● Continued on page 54



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with a decision in which the issues are less clear cut. Remember that his second responsibility is to bring the fire under control in such a way that the least possible damage to property will result. In the long run the smallest possible area will be burnt if all the available fire fighting forces are concentrated on containing the perimeter of the fire. The importance of doing this is greatly magnified if there is any likelihood of a change in the wind. The Clare fire is an example of the way in which the area burnt can be multiplied by a change in wind causing a long, fairly narrow fire to double and re-double its width.

On the other hand, the Fire Control Officer is faced with the situation that a house, farm buildings and other high value assets are directly and immediately threatened by the fire. It is very difficult for him to do anything else but use part of his forces in an effort to protect these threatened assets, even though there is the possibility that by so doing he is delaying the attack on the perimeter of the fire which, in due course may threaten more homes and more property.

Ideally, if each property owner has put into effect the recommendations of the Bush Fire Research Committee, the homestead will be safe without the need for additional fire fighting equipment to be detached to protect it. So, by taking pre-season precautions the owner has not only served his own interests but has made a contribution towards the fire protection of the district, since his foresight will enable the available fire fighting equipment to be used more effectively. This is one of the more important lessons which we can learn from the bigger fires which have occurred in recent years. The effectiveness of the fire control organisation as a whole is very dependent upon the measures taken by individual property owners to protect their own assets.

In the situation we have been examining the Fire Control Officer is already fully extended in his efforts to halt the spread of the fire and there is usually nothing extra that he can do, beyond what he is already doing, to prevent the fire reaching the homestead.

Back Burning

Back burning should not be regarded as a last resort to stop the progress of a fire when all else has failed, because the circumstances in which this method of attack can be used successfully are limited. In the sort of conditions when fire fighting equipment is unable to make much impression upon a fire out of control, two considerations must follow:

- a. Firstly, the back fire if lit will be very difficult if not impossible to control—and if it gets out of control it will only contribute to the spread of the main fire.
- b. Secondly, in conditions of this sort, the back fire even if kept in control will make very little progress burning back towards the main fire and is unlikely to provide the hoped for break in a short time.

Therefore back burning is a method of attack which can only be used successfully in moderate conditions. There are certainly cases where back burning in relatively safe conditions (for example in the evening) can reduce the amount of work to be done in controlling a fire, or where in the absence of water, burning progressively and carefully from a raked line or track towards the flanks of a fire can be a useful tactic.

But in the face of a head fire travelling fast out of control back burning is unlikely to produce any useful result; it is much more likely to extend or accelerate the spread of the main fire. Three conditions should be satisfied before a back fire is lit:

1. There must be a clear advantage to be gained compared to other available methods of control.
2. It must be certain that the back fire can be controlled.
3. Fire Control Officers are the only persons empowered by law to authorise the lighting of a back fire.



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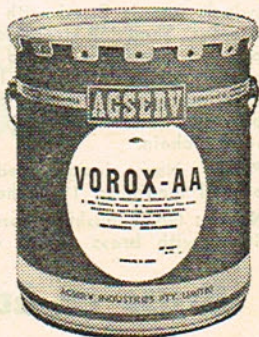
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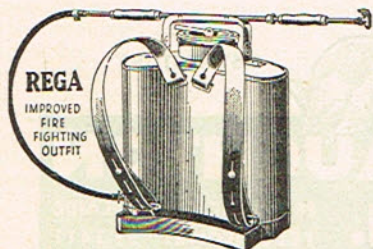
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LOCAL FIRE TELEPHONE NUMBERS

Attention is directed to the need to advise your local PMG Telephone Exchange of the **current list of FIRE TELEPHONE NUMBERS**, in the order of priority, together with the names of the officers concerned. This particularly applies to manually operated exchanges, but automatic exchanges should also have this information on hand.

It is in the interests of E.F.S. members to ensure this list is accurate, as the PMG Department cannot take the responsibility for incorrect calls.

Please take appropriate action, prior to the bushfire season, in addition, have the list revised annually, or when required.

FIRE CALL TELEPHONE NUMBERS: Readers are advised to obtain telephone numbers locally, and to record them near their telephones.

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OBITUARIES

HERBERT STANLEY RUSH, Secretary to the Minister of Agriculture and Forests, died suddenly in Adelaide on 3rd January 1968, aged 59 years.

All who knew Mr. Rush (Bert to his many friends) found him to have a most likeable personality. He was a person whom everyone respected and he will be sadly missed.

He was educated at the Adelaide Technical High School and the University of Adelaide where he obtained the A.U.A. Com.

He joined the South Australian Public Service in 1924 and during the period 1952-1958 he was Secretary to the Mines Department. On 28th April, 1958, he was appointed as Secretary to the Minister of Agriculture and Forests and in this capacity he served under the Hon. D. N. Brookman until 1965 when the Hon. G. A. Bywaters became Minister.

In addition to being Chairman of the Bush Fires Equipment Subsidies Committee, he was also a member of the Bush Fires Advisory and the Fauna and Flora Conservation Committees, and a Trustee of the Volunteer Fire Fighters Fund Committee.

MAJOR ALBERT WILLIAM BEEVERS, General Secretary of the Institution of Fire Engineers (U.K.) and former General Secretary of the British Fire Services Association (U.K.) died suddenly in Leicester on 21st January 1968 at the age of 57 years.

Although not known, personally, to members of the EFS, his name had become familiar throughout many Brigades in South Australia during his period as General Secretary of the British Fire Services Association.

Major Beevers had an eventful career in many respects, including being a member of the Aldershot (Military) Fire Brigade in 1938 and a year later, on the declaration of war, joining the Scots Guards before being commissioned into the Argyle and Sutherland Highlanders. Later, he was seconded to the Army Fire Service serving in Gibraltar, the Middle-East and in North-West Europe. He was demobilised with the rank of Major.

In 1948, Major Beevers became General Secretary of the Professional Fire Brigade Association and the National Fire Brigades Association, forerunners of the B.F.S.A., of which he became Organising Secretary in 1949 and General Secretary in 1952. In October 1964, Major Beevers relinquished that post to take up the General Secretaryship of the Institution of Fire Engineers.

In addition, he was Hon. Member of the Belgian and French Sapeur-Pompier Federations, and held the B.F.S.A. Long Service Medal. He was Mentioned-in-Despatches in North Africa in 1943.

Major Beevers was the first person outside of Australia to be made an "Associate Member" of the E.F.S.

OBITUARIES

LAURICE W. MASON, Lobethal E.F.S., passed away 2nd February, 1968, result of vehicular accident.

LIONEL H. AIRD, Moorook E.F.S.

O. ROY ROGERS, Naracoorte E.F.S., passed away 26th April, 1968.

G. VICTOR THIELE, Mount Torrens fire unit and Chairman of District Council of Gumeracha Bushfires Advisory Committee. Passed away 9th July, 1968.

FRANK C. GUMLEY, A.M.I. Fire E., P.M.G. Department Protection Officer (S.A.), Associate member E.F.S. Headquarters Reserve, Member of S.A. Committee of Australian Fire Protection Association. Passed away 27th July, 1968.

ERIC W. MATHEWS, Keith E.F.S., passed away 20th October, 1968, result of vehicular accident.

WALTER C. ROSE, One Tree Hill E.F.S., passed away November, 1968.

APPRECIATION OF ASSISTANCE GIVEN TO HEADQUARTERS STAFF

With an increasing number of Brigades and members taking part in E.F.S. competitions, lectures, drills and training school programmes, there is a correspondingly heavy demand on the E.F.S. Headquarters Staff.

It would not be remotely possible to meet these demands without the valuable assistance given by many volunteer E.F.S. Officers and associated supporters.

The sincere appreciation of the Director of Headquarters Staff is expressed to the Regional Officers, District Officers, Station Officers, members and associates, who play a leading part in organising and conducting these vital activities.

A TRIBUTE OF APPRECIATION TO DONORS AND ADVERTISING PATRONS

The publication of the E.F.S. Manual would not be possible without the support of the advertising patrons and donors who contribute to make this endeavour a success.

It is with pleasure that donations and trophies are acknowledged on behalf of the E.F.S. Manual Amenities Fund.

The thanks of all E.F.S. members are due to these patrons of the rural volunteer fire services.

F. L. KERR, M.B.E., M.I.FireE.,
Director of Emergency Fire Services.

UPPER SOUTH-EAST FIRE FIGHTING ASSOCIATION

Until six years ago, there was only one inter-district fire fighting association situated east of the River Murray and south of the Adelaide-Melbourne railway line. This was the South-East Fire Fighting Association with its activities situated around Naracoorte and extending northwards to Bordertown, southwards to Mount Gambier and Port MacDonnell and westwards to beyond Lucindale.

This left a gap in the general area between Murray Bridge, Lameroo and Keith which was quickly becoming a rural area of great potential. What had previously been known as the "90-Mile Desert" was now rich farming land with an increasing level of primary production. With this added prosperity, came the increased threat of annual bush fires.



Mr. S. D. Crouch

There were already established a number of volunteer EFS Brigades but distances between settlements was vast and efforts at fires and burning-off were not always co-ordinated.

On the 8th March, 1962, the Coonalpyn Downs Fire Fighting Association (operating only within the area of the Coonalpyn District Council) convened a meeting of EFS Brigades located at Keith, Meningie, Peake, Cookes Plains and Coonalpyn. The object was to form an Inter-District Fire Fighting Association covering the district councils in the Upper South-East. This meeting was presided over by Mr. S. D. Crouch (see photo) of Field and was held at Coonalpyn. The proposals were favourably received and it was decided to hold a further meeting six months later.

At the second meeting held at Coonalpyn on the 19th September, 1962, the Upper South-East Fire Fighting Association was formally inaugurated as such with representatives from the District Councils of Peake, Karoonda and Coonalpyn Downs. The following District Councils were invited to join; Tatiara, Lameroo, Pinnaroo and Meningie. Mr. S. D. Crouch was elected President, with Mr. M. Dunstan as Secretary and Mr. D. A. Crouch as Vice-President. Other delegates present were Messrs. M. Dall and W. F. Crouch from Peake District Council; V. K. Petras, N. Petras and R. Roberts from Karoonda District Council. The Association was Registered with the Minister of Agriculture on 3rd December 1962, as required under Section 27 of the Bush Fires Act.

At a meeting held at the Coonalpyn Hotel on 27th February, 1963, a constitution was proposed in which the area to be embraced by the Association should include the District Councils of Peake, Karoonda, Lameroo, Tatiara and Coonalpyn Downs. It was decided that an annual affiliation fee of £2 per district council be imposed. This was increased to \$6.00 at the 1966 Annual General Meeting.

During the Association's brief existence, it has been instrumental in strengthening the awareness of the public and residents to the hazards of fire. Several notable achievements include the distribution of "Fire Water" signs throughout the council areas; better servicing

WINNING ESSAY ON BUSH FIRE PREVENTION

by Necia Humphrey of Echunga School

Adelaide Hills Fire-Fighting Association 1968 Bush Fire Prevention Essay Competition Winner.

Bushfires are a menace to the country during the hot, dry summer weather. But owing to the wonderful work of the E.F.S., they are usually brought under control much quicker than they were years ago, when they had to be fought by hand.

When a fire starts, somebody spots it and immediately rings the Post Office and from there they sound the fire siren. The members of the E.F.S. on hearing the alarm, drop whatever they happen to be doing at the time and rush straight to the fire station.

No time is wasted before they have the trucks out and are away to the scene of the fire.

These trucks are always kept overhauled and in perfect working order and the tanks are always filled with water ready for any emergency.

When they reach the fire, they quickly unroll the hose and start the pumps and play the water onto the flames. Other men grab knapsacks to use. Walkie talkie sets are used to communicate from one position to another so that the fire fighters always know the exact location of the fire.

These men work tirelessly from the time they get there, until the fire is under control.

Most towns in the hills, have their own E.F.S. unit.

These units are manned by willing men who work voluntarily and always can be relied on to get there as quickly as possible. In many cases if a fire lasts very long, the wives of these men get busy preparing food and cups of tea, which they take to the scene of the fire to feed the men.

If it weren't for these hard working, reliable men, many more homes would be lost, much more stock would be burnt and terrific damage would be caused every year throughout the country.

Three cheers for the E.F.S.

PLACEGETTERS:

Second: Gregory Edmonds of Echunga School.

Third: Keryn McNamara of St. Joseph's School, Macclesfield.

● UPPER S.-E. FIRE FIGHTING ASSOCIATION (continued)

of 2-way radios operated by EFS Brigades; assisting in improving the standards of spark arrestors; erection of a "Fire Hazard Indicator" sign at Taillem Bend.

Mr. S. D. Crouch has been President of the U.S.-E.F.F.A. since its inception and Mr. R. M. Dall has been Secretary since the second meeting. Previously Mr. M. E. Dunstan had occupied this position and he was instrumental in drafting the Association's constitution.

At present there are 31 EFS Brigades within the area of the U.S.-E.F.F.A. with equipment valued at almost \$100,000.

In 1967, several members of the Association gained positions in the Bushfire Research Committee's "Farm Fire Improvement Award", which speaks highly of the interest shown in the area to protection from bush fires, much of which can be directly attributed to the efforts of the Upper South-East Fire Fighting Association.



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REGIONS, AND CALLS ATTENDED BY E.F.S. BRIGADES

Emergency Fire Service Brigades and Affiliated Organisations

The figures in brackets after the name of Brigade indicate the number of calls received for the year of July 1, 1967, to June 30, 1968. Where no figure is shown, this indicates no Fire Reports submitted or no calls received.

E.F.S. Officers are thanked for submitting these Fire Reports. The attention of all Officers-in-Charge and Secretaries is drawn to the note at the foot of the current Fire Reports issued to all Brigades regarding the PROMPT return of these reports.

REGION 1 — CENTRAL

(Yankalilla District Council to Salisbury City Council, including Kangaroo Island)

Regional Officer — E. W. DEARMAN, M.B.E., of Lobethal.

Adelaide Hills F.F.A.	Hindmarsh Ward	Nairne (5)
Aldgate (28)	(Victor Harbor) (4)	National Park (Belair)
Aldinga Beach	Hope Forest (1)	Newland (K.I.)
Aldinga Plains (3)	Inman (1)	Northfield (Prisons Department) (5)
American River (K.I.)	Jervois (1)	Norton Summit/Ashton (6)
Ashbourne	Kangarilla (4)	Oakbank/Balhannah (2)
Athelstone (11)	Kingscote (K.I.)	O'Halloran Hill (C.S.I.R.O.)
Belair (51)	Lenswood/Forest Range (1)	Para Hills (50)
Blackfellow's Creek	Lobethal (6)	Parawa
Blackwood (51)	Longwood/Bradbury/Scott Creek	Paris Creek (1)
Blewitt Springs	Lower Inman Valley	Parndana (K.I.)
Bridgewater (12)	Macclesfield	Port Elliot (1)
Brukungu (3)	Marion (16)	Port Noarlunga/Christies Beach (18)
Burnside (7)	McLaren Flat	Rapid Bay
Callington	McLaren Vale	Salisbury (92)
Carey Gully (2)	Meadows (9)	Sellicks Beach
Cherry Gardens (1)	Middleton	Stirling (32)
Cherryville	Milang (1)	St. Michael's House (Crafers)
Clarendon (1)	Mitcham Hills	Strathalbyn (6)
Cleland National Park (Mt. Lofty)	(includes Belair, Blackwood and Eden Hills)	Summertown
Coromandel Valley (5)	Moana	Tea Tree Gully (66)
Currency Creek	Mobilong (Murray Bridge) (2)	Torrens Vale
Dudley (K.I.)	Montacute	Upper Sturt (5)
Duncan/Gosse (K.I.)	Morphett Vale (16)	Waitpinga (1)
Echunga (1)	Mount Barker (8)	Willunga
Eden Hills (56)	Mount Compass/Nangkita	Willunga—The Range
Encounter Bay (Victor Harbor) (1)	Mount George	Woodchester
Greenhills/Meadows	Mount Lofty Ranges EFS Training Centre	Woodside (8)
Hahndorf	Mylor (13)	Yankalilla (7)
Happy Valley (12)	Myponga	Yundi (1)
Headquarters (Staff) (2)		
Headquarters (Reserve Section)		

Headquarters of the S.A. Emergency Fire Services are located at the S.A. Police Barracks, Port Road, Thebarton 5031. The telephone numbers are 51 7344 (direct line) or 8 0333 (Police Headquarters and after hours fire number).

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FINSBURY WANKEL FIREFIGHTER

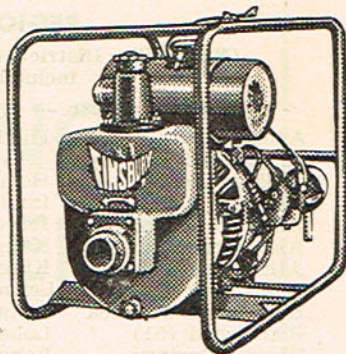
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Heavy Duty
High pressure
100 p.s.i.

- 4.5 h.p. WANKEL Engine.
- 1½ inch self priming pump
- 3,500 gallons per hour
- Maximum lift 300 feet

PRICE \$366

(Hoses and fittings \$46.90 extra)

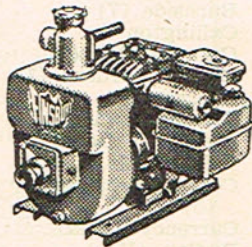


FINSBURY Model HP 1½ in. SPPH/B

- Pressure to 80 p.s.i.
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- 1½ in. self priming pump

PRICE \$185

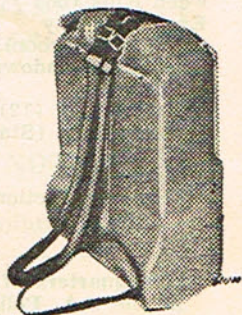
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REGION 2 — LOWER NORTH

(Mannum District Council to Robertstown District Council)

Regional Officer — E. H. V. RIGGS, of Gawler.

Alma	Kapunda (1)	Ridgway
Angaston (10)	Keyneton	Riverton (3)
Auburn	Lower North F.F.A.	Robertstown (1)
Balaklava (1)	Mallala (1)	Rockleigh
Barossa District (Williamstown)	Mannum (2)	Rosedale (1)
Barossa Ranges F.F.A.	Manoora (4)	Saddleworth (1)
Birdwood	Marne (Cambrai)	Sedan/Towitta
Bow Hill	Marrabel	Sheaok Log
Concordia (1)	Mount Crawford	Smithfield (32)
Dublin (2)	Mount Pleasant (1)	Springton
Eudunda (4)	Mount Torrens (N/R)	Swan Reach
Evanston Gardens	Mudla Wirra (Rose- worthy College)	Tanunda (3)
Everard/Mount Templeton	(10)	Tarrawatta (Angas- ton) (1)
Freeling	Munno Para (Gawler) (4)	Truro
Gilbert Valley E.F.S. Radio Group	Nuriootpa (3)	Turretfield R.C. (Rose- dale) (1)
Glen Para	One Tree Hill (3)	Two Wells (4)
Gomersal	Owen	Virginia
Greenock (3)	Para Wirra National Park	Waterloo/Steelton/ Tothill Belt
Gumeracha	Pinery (1)	Watervale
Hamley Bridge	Pinkerton Plains	Woolsheds/Wasleys
	Purnong	

REGION 3 — YORKE PENINSULA

(Warooka District Council to Bute District Council)

Regional Officer — R. P. FORD, of Moonta.

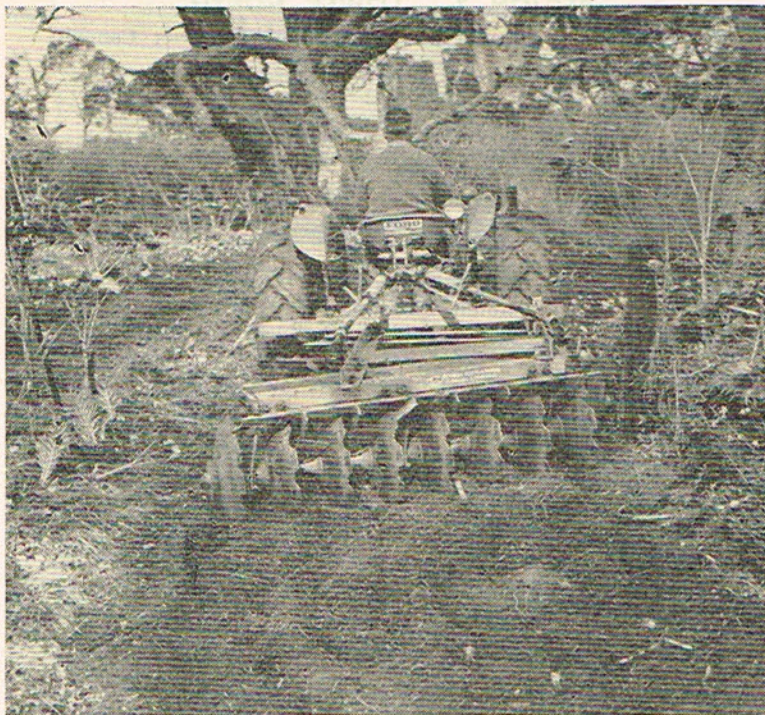
Agery/Weetulla	Edithburgh (1)	Port Vincent
Alford	Kadina (2)	Port Wakefield
Ardrossan (1)	Maitland (4)	South Kilkerran
Bute	Minlaton	Stansbury (1)
Clinton (Arthurton)	Nalyappa	Stenhouse Bay
Cunliffe	Paskeville (1)	Warooka (2)
Curramulka	Port Victoria	Yorketown (5)

REGION 4 — NORTH

(Blyth District Council to Hawker District Council)

Regional Officer — G. M. POLOMKA, of Jamestown.

Appila (2)	Hallett	Peterborough
Blyth (2)	Hawker	Port Broughton
Booborowie (1)	Hoyleton	Port Germein
Booloroo Centre (3)	Jamestown (3)	Quorn (2)
Brinkworth (1)	Kanyaka (Quorn)	Redhill (1)
Burra	Koolunga	Snowtown (1)
Caltowie	Laura (10)	Spalding
Clare (5)	Lochiel	Stirling North
Crystal Brook	Melrose	Terowie
Eastern Dist. F.F.A. (2)	Mount Bryan (2)	Wards Hill
Farrell Flat (3)	Mundoora (1)	Warnertown
Georgetown (6)	Napperby	Washpool
Gladstone (3)	Narridy	Whyte-Yarcowie
Gladstone (Prisons Department) (2)	North-Eastern F.F.A.	Wilmington (1)
Gulnare (2)	Northern F.F.A.	Wirrabara (3)
	Orroroo (2)	Yacka



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REGION 5 — SOUTH-EAST

(Port MacDonnell District Council to Meningie District Council)

Regional Officers — Upper S.-E.: M. T. SHERWELL, of Bordertown.

Lower S.-E.: R. E. MUNRO, of Millicent.

Allendale East	Kongorong (1)	Piccaninny
Apcel Ltd. (Millicent)	Kybybolite	Pleasant Park
Ashville	Lower Murray F.F.A.	(Tarpeena)
Beachport	Lower S.E. F.F.A.	Port MacDonnell (4)
Benara (2)	Lucindale	Reedy Creek
Binnun	Maaoupe	Rendelsham (1)
Bordertown (20)	Marcollat	Robe D/C (1)
Cellulose (Snuggery)	Mayurra	Robe Town
Colebatch (1)	McCullum (Keith)	Rocky Camp
Comaum	Meningie (7)	Sebastapol
Compton/Gambier	Meningie West	Sutton Town
West (6)	Mil Lei	Tailem Bend
Cooke Plains	Millicent (21)	Tantanoola
Coombe (2)	Moorak (1)	Tarpeena (2)
Coonalpyn	Mount Burr (W. & F.	Tatiara F.F.A.
Coonalpyn Downs	Department) (1)	(Bordertown)
F.F.A.	Mount Gambier	Tatiara (Senior)
Coonawarra	Mount McIntyre (1)	Thornlea
Donovans	Mount Schank	Tintinara (4)
Eight Mile Creek	Mount Schank North	Upper S.E. F.F.A.
Emerald	Moy Hall/Stewarts	Wandilo
Field	Range	Wattle Range/Mount
Fox	Mundalla (9)	Graham
Frances	Nangula	Wattle Range North
Furner	Nangwarry (W. & F.	(2)
Geegeela (Western	Department)	Willalooka
Flat) (2)	Naracoorte (3)	Wirrega/Lowan Vale
Glenburnie	Naracoorte Dist.	Woakwine (Millicent)
Glencoe	F.F.A.	Wolseley (1)
Glenroy	Narrung	Wrattonbully
Hatherleigh	O.B. Flat (3)	Wyrie (Millicent)
Kalangadoo	Padthaway (1)	Yahl
Keith (8)	Penola (10)	Yumali (2)
Kingston (2)		

REGION 6 — EYRE PENINSULA

(Lincoln District Council to Murat Bay District Council)

Regional Officers — Upper E.P.: T. R. McKNIGHT, of Wudinna.

Lower E.P.: R. B. S. SINCLAIR, of Port Lincoln.

Arno Bay (3)	Hutchison (Tumby	Port Kenny
Brooker Ward (4)	Bay) (3)	Port Neill (4)
Butler (1)	Karkoo	Rudall (1)
Calca	Kimba (7)	Stokes (2)
Ceduna	Koppio	Streaky Bay
Cleve	Lincoln (Port	Thevenard
Coffin Bay	Lincoln)	Tooligie Hills
Cootra	Lipson	Ulipa (Mt. Hope) (2)
Coulta	Lock (4)	Verran
Cummins (6)	Louth (3)	Wangarry
Cungena	Mangalo	Vanilla
Darke Peak	Minnipa (4)	Warramboo
Edillilie	Moody	Wharminda
Elliston (3)	Mount Wedge	Wirrulla
Eyre Peninsula F.F.A.	Murdina	Wudinna (2)
Franklin Harbor	Poochera	Yeelanna
(Cowell) (1)		

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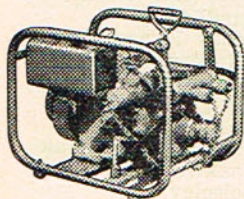
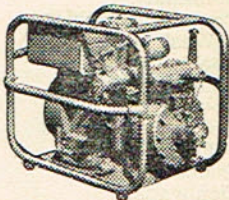
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MARK 35E FIREFIGHTER

Powered by 9 h.p. Briggs & Stratton four-cycle petrol engine with rope and pulley start, and close-coupled two-stage centrifugal pump. The positive priming pump is a hand operated single plunger type mounted within the frame. Waterhead is designed to give two delivery outlets which may be operated independently, and a 1½" tank filling valved outlet is provided.

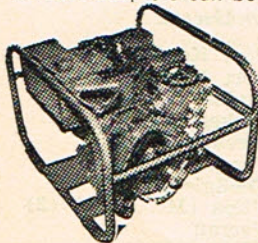
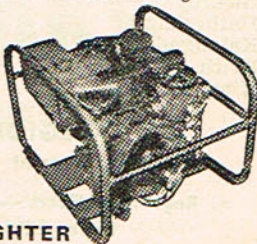


MARK 45B FIREFIGHTER

Powered by 6 h.p. Briggs & Stratton engine with recoil starter. Two-stage centrifugal pump has a casing of Aluminium Alloy, as in all models. The Mark 45B is provided with a 1½" tank filling valve outlet. Delivery hoses—with director gun adjustable from shut off, through a fan to straight through jet—suction hose, and suction strainer are standard equipment with all Gaam Firefighters.

MARK 60A FIREFIGHTER

The 6 h.p. Briggs & Stratton engine powers a single-stage centrifugal close-coupled pump, with anodised impeller fitted direct to engine shaft over a stainless steel sleeve. The waterhead body contains a single control with operating handwheel and three hose adaptors. Each outlet has a protective sealing cap with captive chain so that adaptors can be used individually.



MARK 65A FIREFIGHTER

Powered by a 4 h.p. Briggs & Stratton petrol engine with recoil starter, and single stage centrifugal pump. Shaft sealing is achieved by mechanical spring load carbon faced sealing. Two 1" B.S.P. and one 1½" B.S.P. hose adaptors are fitted to the waterhead body. The suction strainer is supplied with a detachable float to ensure clear water enters the pump.

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REGION 7 — UPPER MURRAY AND MURRAY MALLEE
(Lameroo District Council to Waikerie District Council)

Regional Officer — M. G. ARNOLD, of Waikerie.

Alawoona	Kulkami	Paringa
Barmera (10)	Kulkawurra	Paruna
Borrika	Lameroo	Peake
Brown's Well	Livingstone	Peebinga
(Paruna)	Loxton District	Perponda
Cadell (Prisons	E.F.S. Board	Pinnaroo
Department) (3)	Marama	Sherlock (1)
Cobdogla	Meribah	Taplan
Coomandook/Moor-	Monash (6)	Taylorville
lands (1)	Moorook (1)	Veitch
Copeville	Morgan (2)	Waikerie (14)
Geranium	Netherton	Wunkar
Glossop (4)	Paisley	Wynarka
Jabuk	(Blanchetown)	Yurgo
Karoonda (1)	Parilla (2)	

INTER-DISTRICT VOLUNTEER FIRE-FIGHTING ASSOCIATIONS

Association	Region	President	Secretary
ADELAIDE HILLS	1	K. S. Talbot	J. G. van der Lee, Meadows, 5201
BAROSSA RANGES ...	2	R. H. Angas	W. G. Keynes, Eden Valley, 5235.
EASTERN DISTRICTS	4	R. R. Cooke	T. G. Perry, Box 10, Burra, 5417.
EYRE PENINSULA ...	6	R. B. S. Sinclair	H. P. K. Dunn, Rudall, 5642.
LOWER SOUTH-EAST	5	A. J. S. Adams	J. J. Johnson, Box 24, Mt. Gambier, 5290.
LOWER NORTH	2	A. S. K. Holding	A. E. Bannear, Saddleworth, 5413.
NORTHERN	4	E. F. Blessing	J. Lindsay Chambers, Clare, 5453.
NORTH-EASTERN	4	R. T. McDonald	P. F. McEwin, Box 44, Peterborough, 5422.
SOUTH-EASTERN	5	B. G. Schinkel	L. C. Orchard, Box 378, Naracoorte, 5271.
UPPER SOUTH-EAST	5 & 7	S. D. Crouch	Miss E. M. Coates, 3a Ida St., Murray Bridge, 5253.

E.F.S. OFFICIAL CORRESPONDENCE

A reminder to Officers-in-Charge and Secretaries of E.F.S. Brigades that the Commissioner of Police has given approval for Emergency Fire Service Organisations to forward light correspondence (fire reports and letters) to E.F.S. Headquarters through their local Police Station.

Envelopes MUST be addressed:

DIRECTOR OF E.F.S.,
POLICE BARRACKS,
THEBARTON.

In this instance NO POSTAGE STAMP will be required on the envelope, and used envelopes may be employed as an added economy. However, the OLD ADDRESS should be CROSSED OUT first.

This concession will allow a prompt return of E.F.S. fire reports from Brigades as soon as practicable after the fire has occurred, and will also prove a valuable saving in postage costs to Brigades over a period of time.

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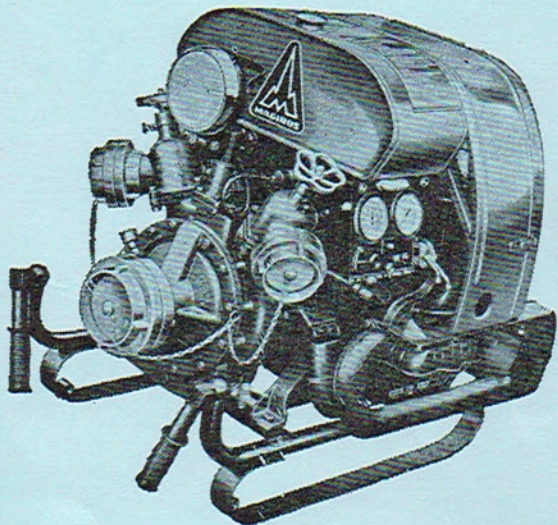
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The E.F.S. Manual is published with the object of distributing educational and technical matter on fire prevention and control, to raise funds to conduct an Annual Smoke Social, and to assist in the purchasing of trophies for E.F.S. volunteer firemen who visit Adelaide during Show Week to take part in the Pump and Hose Drill Championships at Wayville.

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