

JACK WARNE commenced this enterprise not long after the close of the Second World War. Looking back through my records, I notice that I first commented on his production in February, 1951, so I must have received the rifle for investigation before the end of 1950.

A rather interesting little single-shot .22 rimfire it was, too; pin ejection, a very short, crisp 4½-pound trigger-pull, striker-fall only 0.045 inch, open-sight accuracy from Haw-

DICK TUNNEY SURVEYS

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kins prone position (no bench-rests available in those days!) no worse than 4½ minutes of angle, ranging as low as 1½ minutes, and averaging about 3 minutes — ten-shot groups, at that. Must have been before I realised that a sporting rifle should not be expected to hold through a full ten-shot string.

Never mind, Jack and I were both learning our trades in those days and, looking back, maybe he was somewhat more advanced in his then, than I was in mine — though I would never have admitted it then, of course.

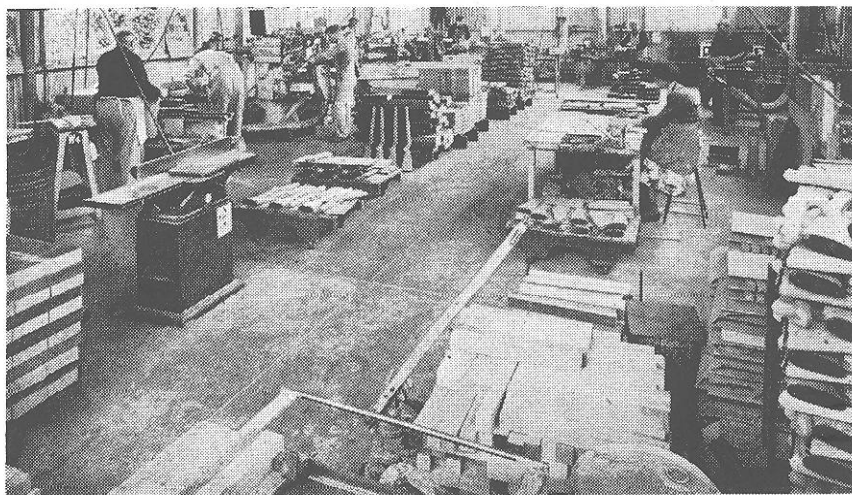
That little rifle ("Hutsman", it was called) impressed me mightily. I have always held that we Australians can turn out a product to equal the world's best, and this was part of the proof of the thesis. Since those days, I have been quite closely in touch with Sporting Arms Ltd. products; I have watched them maintain quality and performance while expanding production; I have never been disappointed with any of their products; and I have never heard any shooter (a notoriously cranky species) damn a Sportco rifle or shotgun. I tucked all this away as further proof of my argument.

Now, I knew they had expanded. After all, the setting-up of sales offices in all capital cities, the taking-over of the Parker-Hale agency, the entry into the saw-chain field as representatives of one of the major American manufacturers, and local production of the same manufacturer's powder-powered fastening tool (the "Drive-it" gun), all pointed in the one direction, that of a rapidly-expanding organisation. Obviously, of late years Sporting Arms Ltd. has by no means been a two by four show. But just what it did, and how it did it, remained more or less guesswork.

So I sloped off to Adelaide to see for myself; in point of fact, the suggestion originally stemmed from Jack, ably seconded by Ron Holmes of Riverbrand Ammunition.

Now I had rather expected something rather developed; I did not anticipate finding a factory covering 35,000 square feet, situated on 2½ acres of land, with a total staff (throughout Australia) of 190, including a dozen toolmakers and seven men on the engineering and design side. I did not expect to see a sophistication of process stopping

There is no doubt in my mind that Sporting Arms Ltd. is the largest undertaking of its type in the country; probably it is one of the largest such in the southern hemisphere. Its story is one of success achieved over only a few years and, in my opinion, that success is richly deserved. It is not surprising that the company enjoys the lion's



Top of page: General view of the factory's exterior. Above: The "wood shop" showing trays of stock blanks and finished stocks ready for final processing.

share of the Australian market, nor that it is reaching afield, exporting to New Zealand, Canada, and England.

We shooters are, of course, interested only in that part of the organisations' production which we ourselves use, so I propose to confine my comments to its rifles, shotguns and ammunition.

just short of full automation, and I had hardly thought to run into a carefully worked out operative training programme.

They make all their own barrels there in the factory (incidentally, I have mounted eleven of their .303/.25 barrels on S.M.L.E. actions, and bedding to my own ideas, held the lot of them to between $\frac{1}{4}$ and $\frac{1}{4}$ minutes of angle). The .22 rimfire barrels come to the factory as bright steel bar, 35-40 tons per square inch tensile strength, which is then cut into suitable lengths. This is adequate for rimfire purposes, but high-power barrels call for something stronger and more resistant to erosion; here they use 55 ton forged blanks provided by Lithgow Small Arms Factory.

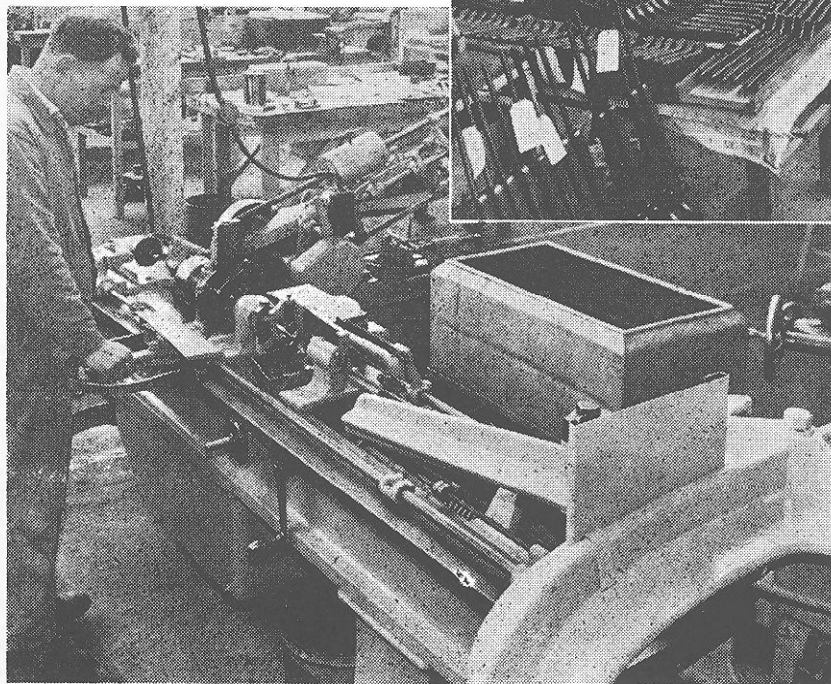
Next operation is to centre one end, in readiness for the twin-head deep-hole drill. Here, with a lubricant pressure of 1000 pounds per square inch, the bores are drilled 0.006 inch under finished size. The balance is reamed out in two passes, removing 0.003 inch at each pass; the last cut is with a negative rake reamer, in order to produce a high degree of smoothness in the bore.

Whenever a long cut is taken on a barrel, as in this boring process, there is a tendency to warp; consequently, after boring the barrels go to the barrel straightener, who uses the hammer and lead block technique which has been in use for many hundreds of years, and which has not been improved upon although there are several other techniques in use.

Also, there is a tendency for the drill to wander in such a long hole; and, it is essential that bore and outside contour be concentric. Sporting Arms Ltd. achieve this by now turning concentric with the bore the end opposite the entry of the boring bit (which, entering through the centre hole, is already concentric); after re-straightening, the barrel is turned at its mid-point concentric with the bore; another re-straightening, and the outside contour is turned, followed by a full-length outside grinding operation. Once more to the lead block and hammer, and the barrel is ready for the rifling machine; that is, it gets this far if it withstands the inspection for flaws carried out after the final bore-reaming operation.

The factory evidently goes to much trouble to ensure that its barrels are both straight and of concentric form. Both these conditions are essential if a barrel is to shoot at all well.

Below: The barrel section showing the Pratt and Whitney rifling machine with operator preparing a barrel.



Bores are rifled with the Pratt and Whitney hook scraper; extreme care is taken. Only 0.0002 inch is taken out at each pass, requiring up to twenty passes in each groove to finish. The hook scraper is often criticised as tending to tear rather than to cut the metal, and so it will, if cuts are deep; at two ten-thou. per cu, there can be little complaint with the finish of the groove produced. Automatic advance of the cutter is used to deepen the cut after every revolution of the barrel, and at each setting the cutter passes through each groove in the customary fashion before advancing.

After shouldering, high-power barrels are threaded on a thread-mill, to facilitate indexing to the body; rimfire barrels are pinned into the bodies. Chambering is next; rimfire chambers are reamed slightly under-size in the lathe, and finished by hand during final assembly of the rifle, while high-power chambers are cut in three steps — first a parallel drill to open up to just below neck-diameter, then a tapered drill to form most of the body of the chamber, followed by final reaming to size. Such a technique is productive of good chambers.

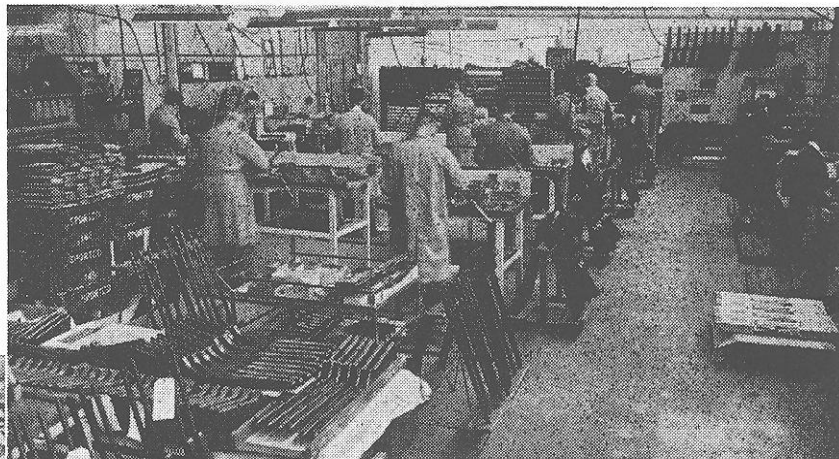
High-power barrels are test-fired before assembly in order to check them for correct chamber finish and dimensions. With the best will in the world, it is very easy to cut a large chamber oversize and/or untrue; such a check is very essential.

Shotgun barrels follow much the same processes as rifle barrels, but, of course, there are fewer operations. The same care is taken to preserve concentricity of outer and inner radii, and they are bored from solid stock in two passes.

High-power rifle actions are not (with the exception of the company's .22 Hornet model) manufactured in the factory. Those in current use comprise principally the military Lee action, both No. 1 and No. 4 designs. These are thoroughly worked over before use, any faulty samples being rejected, and the others brought to standard specifications. Much use has been made in the past of Cadet Martini actions, both for .22 rimfire and for high-powers like the .218 Bee and the .22 Hornet, but those stocks left are now being reserved for the company's very good Martini-actioned target rifle. These too, of course, are selected and worked over; when I was there, there was a batch of firing pins for these actions being made.

The actions for the whole of the remainder of their range of .22 rimfire rifles, and for the bolt-action .22 Hornet design, are made entirely at the factory. High-tensile steel tubing supplied by British Tube Mills (another Adelaide show) is used for the bodies; it is bored out to close tolerances to accept the breech mechanisms, and milled as required to form the slots required. In the instance of the Model 90 slide-action, which is flat-sided in the body, all such operations are, of course, milling and broaching; and equally of course, tubing cannot be used.

All breech mechanisms employ bolts which mostly can be turned on lathes, with only a minimum of milling. This design increases production, and helps to maintain tolerances. Much use is made of stampings in the trigger mechanisms; it is not uncommon to decry such a design but, to me, it seems that



Above: General view of the assembly section. Completed rifles can be seen on the racks prior to final testing. Sportco rifles are despatched to many overseas countries.

this is an application to which stampings are peculiarly well adapted.

Magazines of the box type are cut from contour-formed steel tubing; it is really amazing the number of press operations needed to form the blanks into finished articles, especially in providing feed lips and clips for floor-plates. Tubular magazines, of course, do not require as many operations.

Barrels are assembled to bodies in jigs before blueing. "Colour-Sal" is used for this purpose, a preparation productive of a deep, lustrous finish which is helped by the ground finish applied to the components. This is one of the few operations in the factory which has not shown itself susceptible to at least mechanisation; it still calls for a craftsman's touch to achieve the desired colour.

Stocks for the whole of the production of the factory are manufactured in a separate

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annexe, using rose alder, myrtle and sycamore. The wood comes in in planks, and is first cut to length, then bandsawn into suitably-shaped blanks. These blanks are jigged for boring for takedown screw holes, then precision-routed to form the action mortices and barrel channels. Outer contour is formed on a single-head copying lathe equipped with three tracking cutters rotating at some 24,000 r.p.m.; an oversize pattern is used, and the resultant stepdown in size would assist, I should imagine, to hold close tolerances.

The cutters leave the stock much rougher than is acceptable, so from the copying lathe they go to a belt sander, the belt running over a soft wheel. Here they are brought almost to their final size and finish, another operation depending for its success on the nice judgment of the operators. This is performed with butt-plates fitted, to ensure a correct agreement with the size of the stock.

A final hand-sanding leaves the stocks ready for staining and polishing to the satin finish adopted by the company.

Fully-assembled rifles are all fired at 25 yards on one of the two testing ranges maintained in the grounds, and the sights are adjusted to hit in the centre of the aiming mark used. At least twelve rounds are fired through each rifle, which must group within

or excessive expansion), which is subjected to 100% inspection on receipt. The cases are then automatically fed to a dial plate where, in three stations, they are first filled with liquid, then decapped by a male punch entering their mouths.

After degreasing and polishing in a trichlorethylene bath, they are then full-length resized to standard dimensions on an automatically-fed horizontal press. In the next operation, they are first formed down to the required calibre (crimp is swaged out of the cap-chamber in this same operation), then trimmed and annealed to Brinell 90-92 hardness.

Capping is done by automatically feeding both cases and caps, whereafter the capped cases proceed to an entirely separate filling point. Here the ammunition is completed by a most ingenious machine, developed by Sporting Arms themselves, which automatically feeds the cases, fills them, checks height of load (a precaution against overloads), feeds and seats the bullets, and lightly crimps the necks.

The capacity of this section of the factory is not stated, in fact, I rather doubt that it has yet been run to its full extent, so I can say only that it is obviously very high. Automatic processes have been developed to a very great extent, without, so far as I could judge, detracting to any extent from the uniformity of the finished products. They do not make their own bullets; these come from I.C.I.A.N.Z., and these are good bullets.

A factory of this description is of the greatest defence significance. Adelaide is

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peculiarly well located strategically as far away as it is possible to get from aerial or maritime attack, and where a land-borne attack would have to penetrate the full depth of defence. In the event of war, its installations would be as nearly immune as could be achieved in this country. And here we have an extensive, highly developed, modern, well worked out factory which over the years of its operation has amassed a wealth of information and experience in the manufacture of small arms.

It is true that to date their technology has concentrated primarily on the production of relatively low-powered arms — low-powered, that is, by military standards. But, the problems of manufacture of military and of sporting small arms are mainly ones of detail, not of basic principle. I am firmly persuaded that this company could very easily swing over to the production of military weapons including machine carbines, rifles and light machine guns. Certain equipment would need to be added for some of the processes involved, of course, but this would not present major difficulties. Their ammunition production could very easily be multiplied.

I came away from Sporting Arms Ltd. with one major impression — that of quality control carried out to the ultimate possible degree. It is very clear that costs have had to take a back seat wherever they tended to conflict with performance; at the same time, they have been cut wherever it has been possible to do so without detracting from performance. The result has proven very acceptable; equipment which consistently performs well yet is reasonably priced.

Sporting Arms Ltd. is unquestionably the holder of the success record in the Australian shooting field. And this success has been well merited; it is attributable to giving the shooter a range of equipment which has proven extremely suitable for local conditions, and of a very acceptable standard. There are plans for the future, which for the moment must remain confidential, but which I personally found most interesting; when they mature, I am sure that they will prove as satisfactory as earlier articles.

Just further proof that Australians can deliver the goods!