

### 4.1 Manufacturing attitudes and equipment

Since 1978, over 16000 papers have been published that involve some references to 'spinning' or to 'spinning systems'. Of these, fewer than 200 have been concerned with 'fancy', 'effect' or 'novelty' yarns and their production. This is only slightly above 1% of the total and would be regarded by most observers as being almost insignificant. Indeed, in an editor's comment that prefaced an article on the subject by L. Bellwood in 1977 in *Textile Industries*,<sup>7</sup> it was noted that 'many mills discarded novelty twisting as a slow, expensive nuisance years ago'. Clearly, this suggests that, in the late 1970s at least, a most discouraging state of affairs existed in the fancy spinning sector. However, times change, and the situation then described offers us little explanation for the great profusion of fancy yarns now available, even if it does provide a perfectly reasonable background for the general ambivalence of attitude expressed in certain sectors of the industry concerning fancy yarns and especially fancy doubled yarns.

It is, however, also worth noting that for those who continued to offer fancy yarns there have been several peaks in demand in the period covered by that analysis. Admittedly these peaks have been fuelled by developing technologies rather than by a return to popularity of familiar effects. However, we should recall, when we consider this point, that the newly developed technologies involved do not necessarily create entirely new and previously impossible effects. Instead, they may simply make a particular effect very much easier and cheaper to produce at a consistent level of quality. It should be remembered, furthermore, that the production of commodity items, such as plain yarns, rarely offers high or sustainable profits, at least in those geographical areas experiencing high overheads and wage costs. Both of these considerations offer excellent reasons for any spinner to maintain some fancy twisting capability in good order, and therefore to be able to produce the rarer, and thus higher-margin, fancy yarns or fancy doubled yarns.

Even as recently as the 1990s, many old spinning frames were still being used to produce fancy yarns. This was not necessarily for what may seem to be the obvious reason, which is that new equipment would be too expen-

sive for a company unwilling to make investments in plant and machinery. In niche markets such as this, depending on the specific focus of the company and its customers, the newest machinery is not always required, and an older spinning frame may be just as effective as a new one in producing the more traditional qualities and structures. It has also this advantage that, as the machinery is not a recent and high-cost addition to the equipment, those responsible for planning may not feel that these machines must be run at top speed all the time. One of the most important attributes of a good plant manager must be that of being able to identify the best time to invest in new equipment.

We should recall here that it is not always the case that running a machine at its highest possible speed is the best way to guarantee efficiency. On the contrary, any production line can only produce goods efficiently in cost terms at the speed of its slowest machine. Attempting to run all processes independently at their individual fastest possible speeds, without reference to each other, simply results in vast amounts of work-in-progress, and therefore in considerable capital tied up in unsaleable (because unfinished) stock. Thus, it often proves useful that less complex effects and slower processes may be run to good effect on well maintained, but elderly, spinning frames. In addition, such a system allows the continuing production of the standard fancy yarns while new, speedier, and more flexible machinery is installed and the workforce trained in its operation. This, in turn, ensures that in so far as it proves feasible to do so, it is possible to minimise the effect upon the customer of the upheaval involved in installing new equipment in the spinning mill.

At the same time, this point should not be over-emphasised, because the older machines are very much slower, less precisely controllable, and far less versatile than the new ones, besides being expensive to maintain, in skilled manpower if nothing else. However, continued production of the basic fancy yarns (primarily bouclés) on the older machines allows the newer, more flexible machines to be used for the more complex, higher-margin yarns, where the better control these machines provide can be used to provide significant advantages. It is clear, of course, that a company wishing to focus on short runs, rapid delivery and the most up-to-the-minute and fashionable effects, will be better served by having the most modern and flexible equipment.

## **4.2 Applications for fancy yarns**

### **4.2.1 Yarns for weaving**

It is most often the case that the fancy yarns that are intended from the beginning to be used in weaving are produced using the conventional

route, which is based upon adjustments and extensions to the ordinary ringframe. These yarns are usually 'balanced' yarns, that is to say that the twist inserted by the spinning process is sufficient to hold the yarn together, but conversely it is not sufficient to dominate the behaviour of the yarn.

### *Handloom weaving*

The market for yarns for handloom weaving is small and is likely to remain small. It seems fair to assume this to be true, in spite of the increasing popularity of all handicrafts, up to and including the production of apparel or furnishings from fabric spun and woven in the home. There are relatively few handloom weavers in Western Europe – only about 250 serious handloom weavers were found in the UK during research in 1991, and there is no reason to believe that the pattern would differ in the rest of Europe or the USA. Of these, by no means all will work full-time at the loom. However, handlooms are still used extensively in the developing world, so the size of the market will probably not decrease. Obviously, handlooms do not produce the length of fabric per hour that can be produced on an industrial loom: this, after all, is the basic reason for the increasing industrialisation of production throughout history, so the volumes involved will remain small.

Fancy yarns are indeed used in this area, but they are most frequently used in the field of textile art. This does not, as a rule, lead to repeat business, and will rarely use even so small a quantity as a single kilogram of any one yarn, be it a fancy yarn or a plain one. We are speaking here of the situation in the 'developed world' – in the 'developing world', handloom weaving on large shuttle looms still forms part of the mix of techniques in general commercial use. However, the handloom, at first sight, seems likely to decrease in overall commercial importance as the number of recently equipped mills continues to grow.

There is one factor which may alter this situation, and that is related to the changing nature of the work of aid agencies in the developing world. Where once they concentrated on feeding the hungry and providing the infrastructure enabling food to reach them, there is now considerable emphasis on providing advice and support to villages and individuals as they attempt to become self-sufficient. There is therefore a growing number of small, village-based co-operative ventures, and since using basic handlooms will enable these businesses to begin their operations with a minimum of expenditure and therefore a minimum of outstanding debt, it is plausible that the number of handlooms in operation will in fact increase. This change in emphasis certainly offers the chance of attaining a degree of self-sufficiency. However, it would not do so, had it not been for a cor-

responding increase in 'ethical consumerism' in the developed world, which ensures the goods so produced will not only reach the market but (crucially) they will have a market to reach.

Based on these relatively new factors, it may, therefore, be reasonable to project that there will be a small and gradual, but continual, growth in this market. Not only does the expansion of interest in handicrafts in the more affluent countries of the developed world show no sign of reversing, it is increasingly the case that handloom weavers in the developing world are producing fabrics of consistently higher quality and more appealing design than in the past. Their products are now finding a greater number of willing buyers in the developed world and the influence of such customers will continue to grow. These weavers may, perhaps, find themselves using more fancy yarns and fancy doubled yarns in the future; indeed, it is possible that their customers will encourage them to do so. Several instances of joint ventures or partnerships between companies in developed and developing countries already exist, and are proving successful; this seems likely to prove more and more to be a model of business worthy of emulation. However, when we look at the production of apparel, for instance, these joint ventures still tend to be more concerned with assembling garments or with applying embellishments such as beadwork or embroidery than with the production of the base fabric.

### *Powerloom weaving*

In the weaving of fancy yarns, the best performance in terms of low end and pick breakage rates is offered by the rapier loom. This arrangement allows the weft insertion to be made directly from the cone or cheese, and it also ensures that the weft thread is supported throughout its insertion. The development of a variety of weft accumulators and storage systems has made it possible to reduce the variations in tension and in yarn travel which result from high-speed weft insertion by allowing the yarn to be taken from the cone or cheese at a constant speed. This speed is independent of the rate of travel of the rapier, and it is carefully chosen to ensure that it does not stress the yarn, either by stretching it or by submitting it to sudden increases in tension. Notwithstanding the considerably improved performance resulting from these developments, some adjustments may still be needed to the loom timing or to the setting of the shed in order to make quite sure that the weaving can continue without undue interruptions. However, other forms of power looms are still used in some weaving sheds, including both projectile looms and powered shuttle looms. Hand-operated flying shuttle looms may still occasionally be used for sampling purposes, and appear as a matter of course in small workshops in some parts of the developing world.

It is the established wisdom that fancy yarns are too weak to be used in the warp of a fabric, which can be subject both to great tension, and to rapid changes of position as the shed is formed. However, some weaving mills are able to do so successfully, producing fancy coloured and textured checks as well as stripes. This success, where it occurs, seems to be due largely to their willingness to experiment and test carefully before committing a fabric to production under any particular loom set-up or timing régime. It will also be the result of cautious (and often very ingenious) handling of the warp at all times. In particular, it is necessary to exercise great care in the beaming and tensioning of the warp. It is likely, too, that some adjustments need to be made in terms of the expected production rate, in order to reduce the number of end breaks experienced. Even so, not every fancy yarn will be able to withstand the tensions put upon it by use in the warp. Further experimentation and innovation is often required to ensure trouble free weaving – or the more realisable manifestation of that ideal situation, in which end breaks are kept within an acceptable range.

Almost certainly it has been the consideration of these compromises that has discouraged the wider use of fancy yarns in woven fabrics. However, as the perceived value of the fabric is likely to be higher, as well as the production costs, it may be the case that the two factors balance each other. This is, of course, a matter for each weaver to calculate for his own operation and his own customers.

#### 4.2.2 Yarns for knitting

Fancy doubled yarns produced using the hollow spindle method are often used for knitting, and indeed one of the major markets for these yarns in the past has been in domestic hand knitting. Where powered knitting machines are concerned, the demands of production rates, and the unfortunate limitations of the early electronic control systems, had for many years restricted the yarns used in these machines to plain ring spun types. It is still the case that, where fancy yarns are used, they may often be knitted on hand-operated flatbed machines, where the operator can be sensitive to sticking places and other difficulties – and that therefore production using such yarns has moved from Europe and other high-wage countries to favoured manufacturing partners in countries with lower wages. However, as the electronic control of knitting machines improves, it is becoming much more reasonable to use fancy yarns to a greater extent in producing machine-knitted goods, as the increasing prevalence of a variety of these yarns in High Street fashion demonstrates. This, in turn, favours the return to Europe of some of the manufacturing for European High Street fashion to manufacturers who are able to respond more rapidly if an item becomes particularly popular and needs to be quickly manufactured and delivered.

*Hand knitting*

Hand knitting, at least as it concerns the domestic hand-knitter, has shown a significant downturn during recent decades. In part, this is because hand knitting is no longer taught, either formally at school or informally at home; in part it may be because there are increasingly so many calls on the potential knitter's time that only the truly enthusiastic are able to continue. There was also a change in fashion, and for a considerable period the hand-made item did not have as great an appeal as once it had had. This too has changed, and like needlework in the 1980s, knitting has recently experienced a renaissance, and with it, a growth in popularity as it has become known to be a favoured hobby among celebrities.

Even though the reduction in this market sector was so sudden and so drastic, the slide is unlikely to continue. Like the other needlecrafts and embellishment techniques, hand knitting appears, disappears, and reappears in couture and fashion design in a cycle. While this cycle is not, perhaps, entirely regular or predictable in time or duration, it does still seem to be reliable in its repetition. It has already been suggested by several respondents that, as life becomes more technically managed and oriented, fashion in clothing and home furnishing is likely to become less so because we will seek to take refuge from our technologically-driven work in the 'homeliness' of the hand-made.

Craft retailers have commented that there have been similar reductions in the general interest in hand knitting before. The more enterprising of these have, in some cases, started to provide hand knitting classes in their regions; in most areas these classes have proved to have a marked and welcome effect upon sales. This should remind us also that there is more than one way to increase the market share of an outlet or a company. It is a point worth bearing in mind, too, that the skilled, enthusiastic hand knitter is likely to prefer to use interesting yarns and patterns, restricting their use of the cheaper acrylic plain yarns for children's sweaters. Thus, although the volumes may not increase significantly, the values very probably will.

*Circular knitting*

Circular knitting is used mainly for the production of single or double jersey fabrics at high speed, and at present it seems unlikely, therefore, that any great use of fancy yarns will be found in this area of production. The additional friction resulting from the introduction of a fancy yarn in a system already fraught with tensions and strains might well prove disastrous.

However, the technique of circular knitting has resulted in the creation of the 'chainette' yarn, which is a fine tubular yarn, usually knitted using either a filament or a fine cotton yarn on a small ring of tiny needles. It finds

a variety of uses in embroidered and knitted-in embellishment, and in woven fabrics produced by some of the more adventurous weaving mills, while some of the slightly coarser chainette yarns have been used to knit entire garments.

### *Flatbed knitting*

The modern, computer-controlled flatbed knitting machine is capable of producing a huge variety of structures, and careful programming will allow it to cope with yarns that vary considerably in thickness. However, the tensions produced by any knitting process are very great, increasing exponentially across the width of the fabric. In a plain yarn which (in theory at least) does not have weak places, these tensions should be easy to absorb. In a yarn such as a button yarn, however, which almost unavoidably includes periodic weak places, and more especially includes such radical variations in yarn profile as to significantly increase the chances of the yarn catching on one of the needles, these tensions will fluctuate uncontrollably and at some point the yarn is likely to snag and possibly even break.

Increasing computer control of fancy yarn production may allow this problem to be at least partially solved; certainly, the reduction of weak places is high upon the agenda at most spinning machinery manufacturers. The improved control that is always being sought will gradually make the yarns more consistent in strength, and new structures may one day be devised that make these intriguing yarns more suitable for a variety of manufacturing processes.

### *Warp knitting*

The great speed and very fine gauge of most warp knitting machines has hitherto meant that fancy yarns are not used on these machines. The fabrics produced are, in any case, not those that would benefit from the addition of yarn effects – their virtues lie for the most part in their consistency of appearance and strength. However, it seems that techniques are being developed whereby fancy yarns ('tape yarns' or 'feather yarns') may be produced on these machines, using filament or plain yarn feedstocks.