# CHROMOID

by Norah McNulty

YOU will have realised from the Editor's account of his visit to see the manufacture of Cinemoid, that this hallowed media, still by far the theatre's most frequently used colour depends on traditional engineering skills, with a series of individual stages of manufacture.

Chromoid, in contrast is based on a new plastic called Polycarbonate. Let's first see how this new technology alters the manufacturing methods.

The chemists at the works told me that they selected Polycarbonate, after a long series of tests, because it offered high mechanical strength, withstood heat very well and had really excellent clarity and transmission. And most important it could — after about a year's work and an extensive test programme, meet Strand's flame retardant standards. With so many sales to schools, amateur dramatic societies, village halls, never mind theatres! — Strand can't risk giving their name to any flammable material.

It was the creation of a technology for the assimilation of dyes of varying compatibility though which proved the real challenge.

The colour laboratory is the heart of the operation. The world of dyes and pigment suspensions is an intriguing one, an arcane mixture of empirical skills and boundless patience, combining the talents of the scientist and the artist.

Originally, the colours for theatre use were in gelatine (hence the word 'gel'), the dyes were available from the traditional dye suppliers in Central Europe, and some dyes long used to make the traditional Cinemoid colours were not compatible with polycarbonate or its method of production. So it was necessary to seek new dyes from all over the world, and often to achieve a near match to a Cinemoid colour meant a seven dye compound.

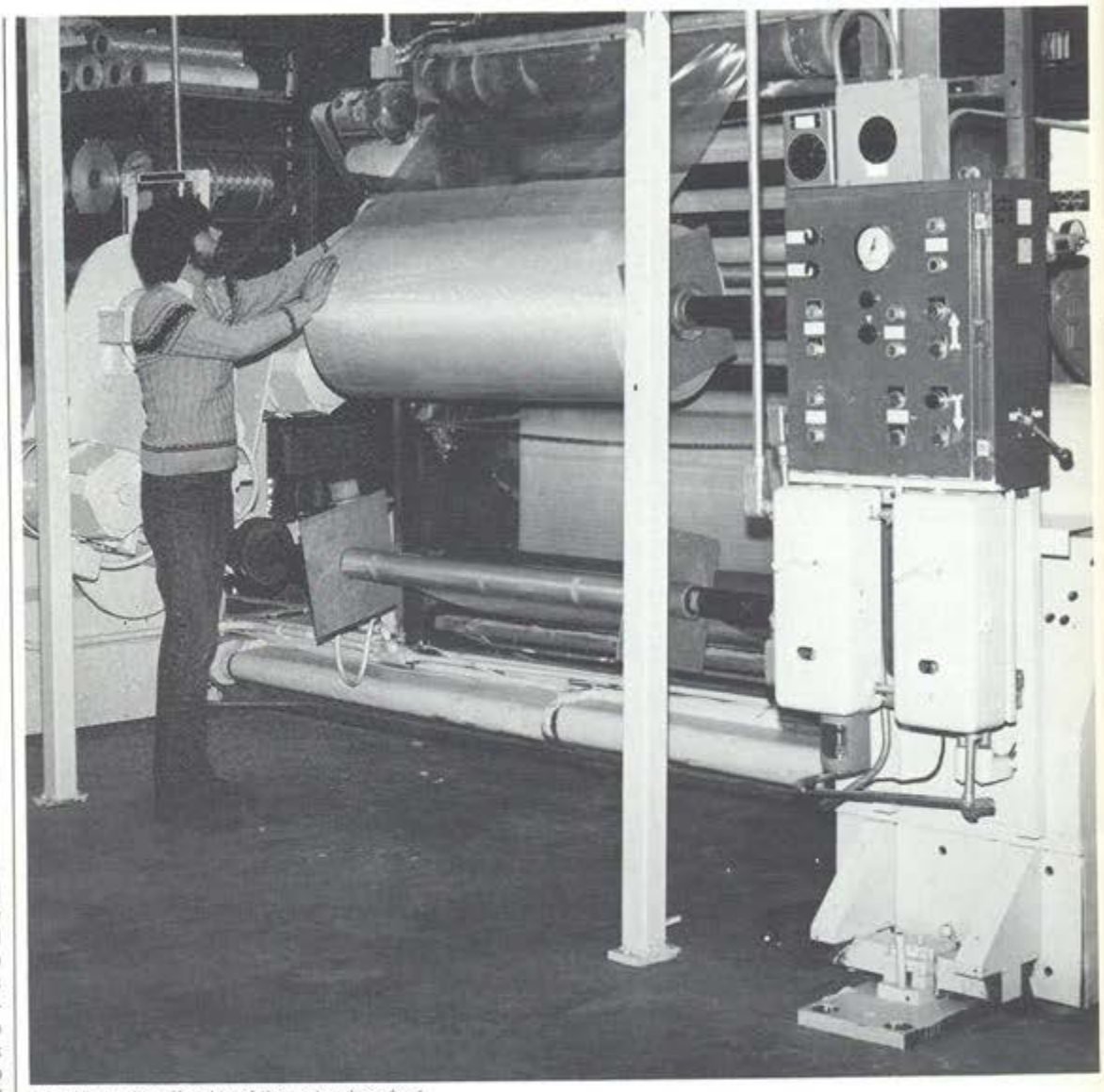
It is only in the last few years that lighting designers have been fully recognised as a truly creative force in theatre. Over many years Strand have maintained a dialogue with designers and have developed many new colours, each with subtle but significant shifts in tints.

In addition, there is a significant change from the traditional tungsten light sources to tungsten halogen which, apart from being more compact, has a higher working temperature and therefore colour temperature. Halogen lamps come much nearer to being a true white.

Designers and public alike have a much more sophisticated awareness and critical faculty developed by exposure to a constant bombardment of images from colour television and film.

Before a colour run, the dye formulae are prepared under strictly controlled conditions. Measurement is by weight determined on digital read-out recording balances.

The polycarbonate pellets and dye compound are fed into a laboratory extrusion plant which heats the resin to 600°F and forces it through precision milled jaws to form a hot flexible sheet which is coiled and cooled on a drum.



*The final take-off point of the extrusion plant.*

Still under control of laboratory technicians, it is monitored for thickness and checked through a recording spectrophotometer for compliance with the master record for the colour.

*Display unit of the integrated computer system which monitors continuously the film gauge.*

If all is well, the process is continued to make up a 1200 lb. weight 'batch' or concentrate and the colour rechecked. The concentrate moves into the main production plant — a noisier and very different world to the cool silence of the laboratory. The plant is one logical production flow. The mixture is fed into the hoppers of the main extruder and subjected to high temperature for complete melting and mixing. The coloured resin, now the consistency of honey, is turned repeatedly in a stainless steel vessel and pressed through a double helix by steel rams to assure mixing by hydraulic pressure, until finally the screw drives the melt through the thin slot of the preset polished die lips.

Many extruding companies can hold a 10% tolerance on gauge thickness and are proud of it — but for colour filters this is just not good enough as the colour density variations will be perceptible to the eye — a remarkably sensitive instrument. The current objective for Chromoid is a demanding 4% tolerance.

The thin hot sheet is cast on a highly polished chrome roller. The large diameter roller is temperature controlled by an internal coolant. The cooling process continues as the film winds around a series of temperature controlled rollers in a tunnel held at a constant humidity.

If the colour laboratory is the heart, the next step is the brain.

The method of controlling and monitoring the thickness is fascinating, straight out of the Space Age.

Downstream from the extruder, a sensing head tracks continuously across the 26-in width. Underneath, a corresponding coil sends impulses from a nuclear low energy radiator through the film. As the sensor reads the film thickness, it displays the information graphically on a V.D.U. screen — a large display unit — which monitors data by integrated computer with the programmed standard. The screen shows 26 bar charts — above or below a horizontal line — each one representing a fine screw adjustment in the extrusion head, allowing instant adjustment to the thickness, while the operator still watches the screen, without stopping the process.