

PRINTECH

A SERVICE JOURNAL IN PRINTING & PUBLISHING

Vol. VI

JUNE 1959

No. 11

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COLOUR REPRODUCTION AND VARIABLES

BY

D. M. DHADWAL

HEAD OF THE GRAPHIC ARTS TECHNICAL SERVICE OF KODAK LTD. IN INDIA

A Paper read at the Seminar

organised under the auspices of the All India Master Printer's Conference at Varanasi

Colour has now come to stay. The advertiser, the print buyer and the public now think in the language of colour. Every one of them would like to see more and more of it in its full grandeur. The old saying that black and white work is the bread and butter of the printer and the process engraver will soon be a thing of the past. It is colour that will rule the day. If colour has taken such a hold over us we must be sure that we know how to handle it.

We have now younger companions to colour printing such as colour T. V. and Colour photography who have by far the same basic problems of production, but these younger entrants into the field seem to have stolen a march over colour printing which because of

its longer history should have been in the forefront. The reason of our retarded progress is not difficult to find. Those of us who handle colour fight shy of understanding it scientifically. We should train all, who are concerned with colour in its scientific and technological aspects ; this includes even Ink makers and paper manufacturers.

What I have seen in my tours in our country and in the neighbouring countries, colour reproduction of both reflection copies and transparencies entails a lot of laborious hand work which not only is expensive but limits the volume of production. It also tends to loose the photographic quality of a transparency and the original brush work effect of a colour painting.

QUALITY in

PRINTING INKS

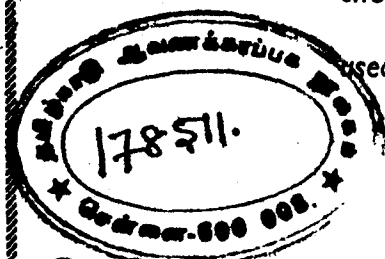
means many things...

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Why have we to do all this laborious hand work at all which takes the shape of chemical dot etching, retouching continuous tone negatives and positives or fine etching. Some of the reasons for this are associated with printing inks, papers and photographic tone scale distortion. There are however now photographic emulsions such as gravure copy film and new techniques which to some extent correct this distortion. But the very best colour printing inks suffer from faulty spectral characteristics and lack of colour purity. They do not reflect the hue of light they are expected to and do not absorb sufficiently the hues they should. In short they do not stay within their own colour limits. For example some yellow may print in areas that should be magenta only or some Magenta may print in an area that should be only yellow. The process Red ink is equivalent to a pure magenta ink contaminated with yellow. Therefore to compensate for it the yellow must be reduced in the areas where magenta has to print. Similarly to compensate for the degraded cyan the other two colours must be reduced in amount.

Another direct consequence of the degraded colours is that they cannot produce the total range and tones of the original. Retouching must be resorted to use the limited capacity of paper and inks to its best possible advantage.

There is, however, a way to do all these corrections automatically or at least semi-automatically by photographic methods known as masking. The Mask is a photographic image that is placed in register with another photographic image of the same object to alter the reproduction characteristics of the later so that the original can be printed faithfully within the limitations of the inks available. Therefore Masking, without having the least idea of the inks to be used, would be a waste of time. There are of course other variable factors which we shall also discuss later but by far the most important is inks which contribute so largely to the necessity of retouching or colour balancing by masking. It is therefore but natural to base our mask strengths on the basis of a set of inks to be used.

If the inks were perfect the following ideal situation would arise.

Negative.	Should print in.	Should not print in.
Yellow	Yellow, Green Red.	Magenta, Blue Cyan.
Magenta	Magenta, Blue Red.	Yellow, Green Cyan.
Cyan	Cyan, Blue, Green.	Yellow, Red Magenta.

In other words yellow must print in areas where there are yellows in the original copy and also greens and reds. Since yellow transmits those colours. No yellow should print in the blue areas since yellow absorbs blue. It should also not print in Magenta and Cyan areas since both of them contain blue. On similar lines explanation of Magenta and cyan can be given.

Of the above hypothetical case if we were to take the density readings of the three colour patches through appropriate filters we will have the following density reading where each ink would absorb one colour and neglect other two.

	Red Filter.	Green Filter.	Blue Filter.
Yellow ink ..	0.00	0.00	1.60
Magenta ink ..	0.00	1.60	0.00
Cyan ink ..	1.60	0.00	0.00

Reading the chart vertically we find the relative densities we shall get in the various positives made from the separate negative. For example in Red Filter Neg., i.e., Cyan printer, no cyan ink prints in the magenta or yellow areas, this is the case of ideal inks but—such inks are still a distant cry.

Our actual readings of the three colour patches would be some what as follows:—

	Red.	Green.	Blue.
Yellow ink ..	0.00	0.10	1.20
Magenta ink ..	0.10	1.20	0.60
Cyan ink ..	1.25	0.40	0.28

Reading across we find that in yellow ink there is a density of 0.10 under the Green Filter, which though not bad would make yellow go slightly orange. Magenta ink absorbs 0.10 of red and 0.60 of blue which it

should not. Naturally this greater error of .60 will add yellow to the magenta which will shift the magenta towards red. The smaller error will make the magenta grey. In cyan ink unwanted absorption of .40 in green would add magenta to the cyan making cyan more blue. The unwanted absorption in the blue will reduce the brightness of the cyan.

Reading the chart vertically will show us the errors in the positives made from the various uncorrected separation negatives; e.g. Blue Filter positive (yellow printer) there are additional density of 0.60 and 0.28 of yellow ink, where only magenta and cyan should have been printed. The purpose of masking is to correct or cancel the densities which appear in addition to the maximum values in the chart. A single mask, however, may under-correct or over-correct the smaller error.

With the help of the above chart we can now determine the mask strength required for a particular ink. We shall consider here only yellow and magenta inks.

In the case of yellow ink, we know, that the additional density record of .60 of yellow where only magenta should have printed, will tend to make magenta redder. The redder is the magenta ink greater is the mask strength required for the yellow printer to correct this error. This mask strength is found by the following densitometric readings:

0.60 is the reading of the magenta put in through blue filter and 1.20 through the green filter negative.

The mask strength should be $\frac{0.60}{1.20} = 60\%$.

This means that the mask made from the green filter negative to be registered on to the blue filter negative should be of 50% density range of the blue filter negative. Since the cyan ink also introduces an error in the yellow printer we should measure its extent. The mask strength required to correct this error is calculated by the same formula but the density values of the cyan patches are used using the blue filter and green filters. This is $\frac{0.28}{0.40} = 70\%$.

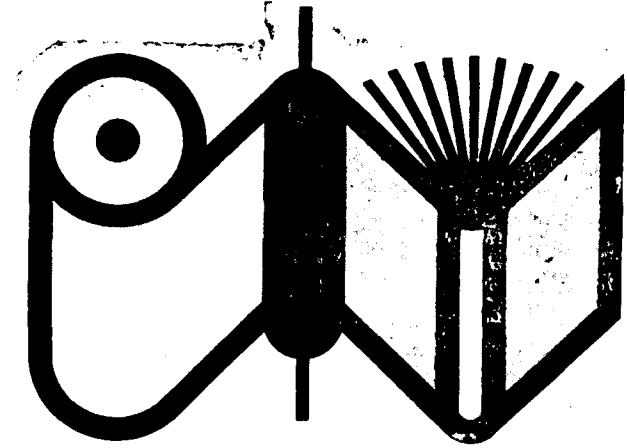
We see that the first calculation called for 50% mask to correct the error in the magenta patches but error for cyan patches needs a 70% mask strength. Therefore if a single mask of 50% is made 20% error for the cyan patches remains uncorrected. That is why for full correction double overlay masks are suggested. (Please refer to data sheet G/A-12 in Kodak Reference Handbook for Graphic Arts) for full details of the double overlay masking).

Percentage mask for the magenta printer is calculated by the density reading of the cyan patches under green and red filters. $\frac{.40}{1.25} = 32\%$. The percentage strength of the mask made from the red filter negative to be bound with the green filter negative should be developed to 32% of the density range of the green filter negative.

Masking would be of no avail, no matter how good it is, if other factors or better term then 'variables' all effecting the end product are not controlled. Ink is only one of the variable.

A properly masked set of negative could be spoiled in the half tone position stage. Variation at this stage are frequent. These can be caused by the voltage drop in arc lamps. Light integrating meter will solve the problem there. Further more process cameras should be properly scaled and halftone exposures could be standardized by keeping the 'time and varying the aperture of the lens according to the 'm' value of the image ('m' means magnification or munification) much can be achieved by way of standardization, speed by the use of magenta contact screen. By pre-determining the exposure required for a particular copy waste can be completely eliminated. Since in this method of making of halftone the shape of dot follows the contour of the original a marked improvement in resolution takes place. To reap the maximum advantage there screen should be used in the camera. This would necessitate putting your gallery type camera in the dark room and attaching a vacuum back to the camera which can be easily done.

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While making halftone positives same reference points the grey scale or of the transparent density strip, should be referred to, maintain the proper relations strip between the various tones and the colour balance of the original.

Processing conditions need much to be desired and often are the cause of altering the colour balance of a set of negative or positive. Under exposure or over exposure would produce a poor dot. Many printers are producing good jobs inspite of adverse processing conditions, but perhaps they have never paused to think 'at what cost?' Given better condition they would do so much better, and would definitely make one common factor of cost 'time'. Light leakage, unsafe safelights, dirty sinks, broken jar and rusted developing dishes and boiling water from tap and high developer temperature are quite a common sight. Very few presses have a chemical mixing room still few would use the standard formulas which are evolved after years of expensive research work. Workers should be taught to respect them and mix the chemicals in the same order as they are given in the formula and should not put a handful of something unknown 'just for luck'!

Inspection method of development in which development is done in perspex dish,

placed over a glass top table having safelight underneath would be ideal for final screen positive making.

Further more it would be necessary to control as much as possible the variations that affect the plate making operations; the proofs should be pulled out in such a way so that they can be duplicated by the machine.

Having controlled all the above variables there may be some which would arise in the printing department. One of them is caused by the variation in colour due to emulsification of inks and the fountain solution. Correct balance will have to be maintained between the ink and the fountain solution. Kodak process densito meter which can also read reflection densities will be a help there.

Having fought with all of them there is one more difficulty which has been pointed out in the presidential address. The import controls, you just cannot get what you want?

Thus we see that good reproduction is the result of a combined and harmonious efforts of all the operations in a print shop. Masking is just one of the link that forms the chain of operation procedures that makes good reproduction. ★

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PRINTECH

MADRAS-1

Teletypesetting comes of age at the

'GLASGOW HERALD'

A Big Step Forward in Setting Techniques. Linotype Supply Special Matrices

The Glasgow Herald celebrated the completion of 21 years of successful Teletypesetter operation by taking a new step forward in this field.

As from Saturday 21st March, its London stock prices will be set by *high-speed* line-composing machines. These machines are in the Glasgow office but will be actuated by a duplicate of the tape produced 400 miles away in London.

Not only is the setting faster, however, it is also better. The many different fractions now composed from superior and inferior characters are infinitely easier to read than when formerly expressed in ordinary numerals and strokes. They are also space saving and preferable typographically.

The combination of swifter setting and better typography has been made possible by pioneering work done by the *Glasgow Herald* in collaboration with Linotype and Machinery Ltd. A system has been devised in which all the characters required for the specialised setting are accommodated in a single Linotype magazine. They include in addition to the fractions a variety of special symbols identical with those of the official Stock Exchange list. Specially duplexed matrices had to be made and these were supplied by Linotype. The use of a single magazine means that high-speed Linotype composing machines may be used.

Personalities most closely involved were Mr. M. W. Brown and Mr. R. Robertson, for

the *Glasgow Herald* and Mr. R. H. Scott of Linotype. They worked together to produce a keyboard layout that would be suitable not only for high speed T.T.S. transmission of stock prices but also for a variety of straight matter. The following are now regularly transmitted:

Produce markets, Classified advertisements, Racing tables, 'The London Letter' Parliamentary copy, Staff (London) copy Company prospectuses and reports, Supplements.

The stock prices are set in 5½-point Time with Heavy to a measure 7½ ems. The whole day's dealings are transmitted by wire in about 1½ hours.

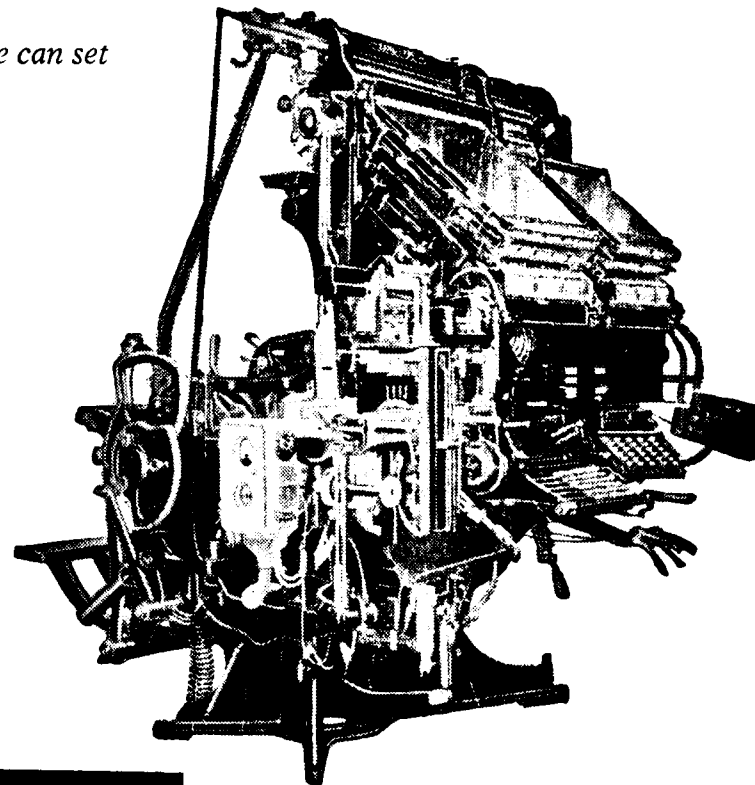
With fourteen Teletypesetter perforators in its Fleet Street Office, the *Glasgow Herald* has the biggest perforator battery in Europe possibly in the World. Transmission is by land line on multi-channel V.F. (voice frequency) equipment to the Glasgow Office in Buchanan Street. The one wire is capable of taking up to twelve transmissions simultaneously—not only T.T.S. but also the spoken word or, alternatively, picture transmissions. The T.T.S. impulses are received at Glasgow and passed to the high-speed line-composing machines in the form of reperforated tape.

The engineering side of the *Glasgow Herald's* London Office is under the supervision of Mr. Sidney Stephens who is responsible for the smooth operation of the new scheme. ★

With equal ease this machine can set

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and dialects.



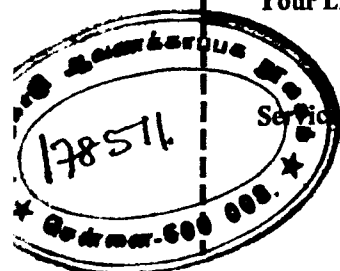
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CHOOSING A PRINTER

BY

WILFRED MACIEL

The general practice in advertising agencies is to invite quotations for a particular job from two or more printers and then to make a recommendation to the client. This system though conventional has its special advantage: it is possible to make a comparison of the various quotations and the quality of paper.

Because of the different methods of costing and estimating, because of the fluctuating prices of paper and because of the extra overhead charges of various establishments the differences in quotations received can, and often are, fairly substantial.

Most agencies get the bulk of their printing done by letterpress, some of it by lithography and photo-offset and a little by photogravure and silk-screen.

Placing orders with printers promiscuously is a failing for which there is no justification.

In many cases because a competitive quotation is absolutely necessary to certain clients, the agency will perforce have to see where the job can be done at the lowest rate yet ensuring that the quality of reproduction is suitable for the nature of the work.

While it is admitted that no hard and fast rules can be laid to choose printers, there are certain factors that influence agencies to deal with particular printers. These include promptness in sending in estimates, maintaining a high standard of workmanship, completing deliveries in time, quoting rates which are generally in line with similar printers and satisfactory packing and despatching.

A good method for a medium size agency is to confine its main dealings to two letterpress printers, one offset printer, and one silk screen

printer. Wherever possible orders should be placed with them.

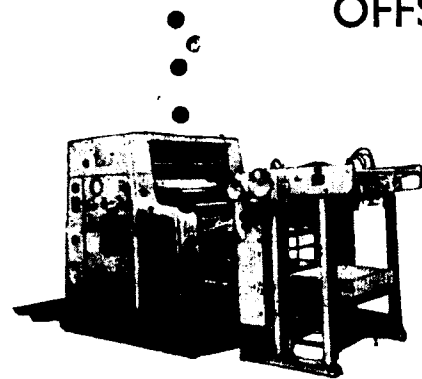
As the printer gets some assured work from the agency he will take considerable interest in servicing the agency. As he gets regular work he will be more willing to accommodate the agency and get a job out in record time, to carry out improvements as the job progresses even though these may not have been estimated for, and to go all out to please the agency. The agency in turn knows that it can depend on such a printer and will even feel confident to make provisional commitments to clients regarding deliveries since it may not always be possible to refer matters to the printer.

Quality work, prompt delivery and acceptable rates often make an agency place work of some clients in the hands of particular printers. The client who has confidence in such a printer feels assured that his jobs will be well done and are entrusted to a press that has given him good work in the past.

As in effect most agency jobs tend to become rush jobs at one stage or another this will not be regarded as a surprise by printers accustomed to do regular agency work. From them the working of printing miracles is a constant expectation and they in turn know they have to oblige the agency if they are to continue getting a good share of the existing business.

If possible rush work should not be entrusted to presses where working "extra" time is not possible. Hence the advantage of printers who work two or three shifts, or who because of the large number of workers and facilities of vast machinery and equipment are able to do a lot of work in the minimum possible time.

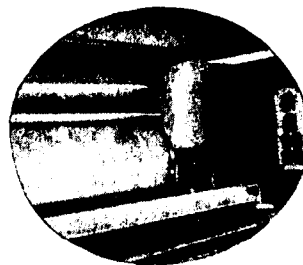
OFFSET PRESS PLANETA



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today

tomorrow



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Clear prints
Diamond draft

Outstanding foolproofness
Easy on the operator
Well shaped casing

Single Colour presses of VEB Druckmaschinenwerk PLANETA:

PLANETA—Super Tertla PEO 4 Size up to 25 x 36 in. (Fig.)
PLANETA—Tertla HEO 2 a-n Size up to 20,4 x 28,3 in.
PLANETA—Tertla HEO 3-1 Size up to 22 x 31,4 in.
PLANETA—Super Tertla PEO 5-1 Size up to 31,8 x 44 in.

Two Colour press of VBE Druckmaschinenwerk PLANETA:

PLANETA—Super Tertla PZO 6-1 Size up to 35 x 49,6 in.

Sales organisation:

POLYGRAPH-EXPORT G.m.b.H.,



Gesellschaft für den Export von
Buro-und Polygraphischen, Maschi-
nen, Berlin W 8, Friedrichstr-61

Representatives for this printing press:

The Standard Printing Machinery Co.

12/81, Sembudoss Street, G. T. Madras I

Over a period of years some presses have established a reputation for successfully doing particular types of jobs: tabular work, cut-outs, high class binding, faithful reproduction in colour work, etc. The agency will naturally tend to favour these printers when they have such type of work in hand. A screen printer who has successfully produced a calendar on strawboard is more likely to be entrusted with an order than a printer who has never done work on such a medium.

Barring a few pharmaceutical and other commercial establishments it is only from an advertising agency that the printer is able to work from a *designed* job. To most printers this is an enticement as they see in such jobs the possibility of showing their best standards of work and dealing with advertising agencies keeps them well in trim as their demands are

fastidious and exacting and the printers are expected to work from given specifications.

Although it is a fact that both composing and printing are mechanical processes, the balance is struck not by the press which has better machines or more expensive equipment but by the press that can boast of skilled workmen and thoroughly experienced hands. In this respect printing remains an art and quality depends entirely on the skill of the craftsmen.

In an agency the human element will count a lot in choosing a printer. No agency would like to deal with a printer who has an arrogant representative no matter how good the work produced at the press may be. Hence the necessity of selecting proper representatives and giving them some training, if necessary, before expecting them to build business and create goodwill. ★

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அன்புடையீர்,

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1959-ம்வரு மேமீ 10-உ ஞாயிற்றுதிழமை காலை 10-45
மணிக்குமேல் 12-மணிக்குள்ளாக

எனது திருமகன்
ஸ்ரீ குமரவேலவனுக்கும்

நம்பிராஜன் திருமகன்
ஸ்ரீ வள்ளியம்மையாருக்கும்

சென்னை, சூலை, ரொட்டி கிடங்கு திருவேங்கட முதலி
தெருவு, 1-16-வது எண்ணுள்ள இல்லத்தில் நடக்கும்
திருமணத்திற்கும், அன்று மாலை நடைபெறும் திருவிதி
புறப்பாட்டிற்கும் தாங்களும் தங்கள் சுற்றமும் நட்பும்
சூழ வந்திருந்து உயரான காட்சியைக் கண்கூடாகக்
கண்டு இதம்பெற வேண்டுகின்றேன்.

இப்படிக்கு, தங்கள் அன்பன்
ஸ்ரீ சோமசுந்தரப் பெருமான்

தங்கள் வருகையை அன்புடன் எதிர்பார்க்கும் :

நார்ட்டன் அண்டு கம்பெனி
சூலை, சென்னை 7

Set in Cauvery Thin Script & Cauvery Bold Script

New Printing School in New York is a Model Institution

The newbuilding and facilities of the New York Printing School, which were dedicated at an impressive ceremony recently, are described by visitors as the "largest and best-equipped school of its kind in the United States."



These apprentice students are learning to operate a monotype key-board for the casting of individual type characters.

Erected and equipped at a cost of \$9,000,000, the city's new vocational and apprentice training center for the printing trades occupies a site of over 40,000 square feet in midtown Manhattan. The main wing, containing the shops and classrooms, is a seven-story, fire-proof building with a frontage of 400 feet on two streets. A shorter wing, housing a gymnasium and auditorium, forms a right angle at one end of the structure.

It has been called a "dream" school because of its modern facilities and architectural design. It combines the most efficient classroom furnishings with shops equipped with the most advanced machinery for letterpress, offset and other printing process operations, composition, photoengraving and book binding.



Learning to set type by hand in a "composing stick," letter by letter and line by line, is one of the oldest and most basic of the printing skills.

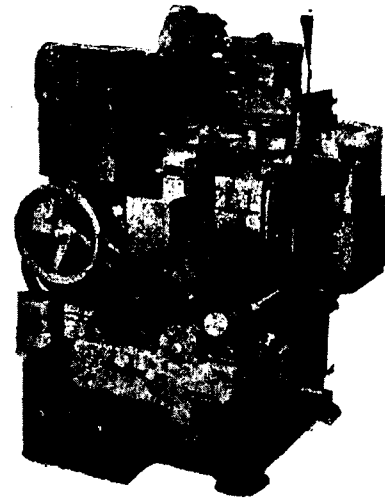
The lighting is fluorescent throughout, located so that no shadows are cast, and designed for close simulation of daylight—an important factor where precision work, such as colour matching, is concerned.

A public address system permits announcements from the principal's office to reach all areas of the building. There is also intercommunication telephone service to all offices, shops and classrooms.

The new quarters provide accommodations for more than 2,700 students. More than half this number are secondary school students taking the combined academic-printing trade course. The rest are enrolled in the apprentice

Introducing the

'MONOPHOTO'



FILMSETTER

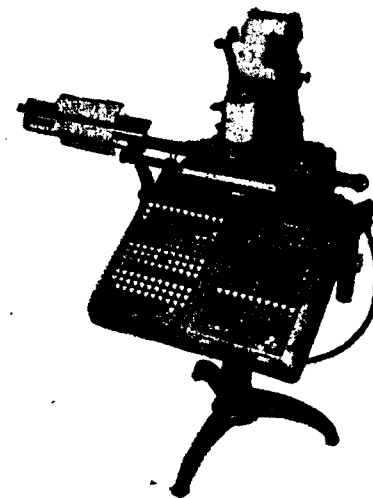
to the

Indian Printer

for the automatic composition of
Devanagari, Tamil, Telugu and Bengali
on photographic film.

A "MONOPHOTO MACHINE" is the filmsetting counterpart of a "Monotype" Composition Caster. Instead of producing columns of single type from molten metal, it produces exposed photographic film or paper ready for development as: (a) wrong-reading film positive; (b) wrong-reading film negative; (c) wrong-reading paper positive; (d) wrong-reading paper negative; (e) right-reading film positive; (f) right-reading film negative; (g) right-reading paper positive; (h) right-reading paper negative; all as viewed emulsion side up.

Your familiar "Monotype" Keyboard, which can be used BOTH for hot-metal composition AND for filmsetting, with only minor modifications. The speed of tapping, general maintenance and, consequently, the over-all efficiency are unaffected.



THE MONOTYPE CORPORATION LIMITED

8 MISSION ROW EXTENSION

CALCUTTA

Offices at MADRAS, BOMBAY, DELHI

* Registered Trade Mark

training division or in evening classes for journeymen who wish to learn more about new methods and processes, or specialized skills.



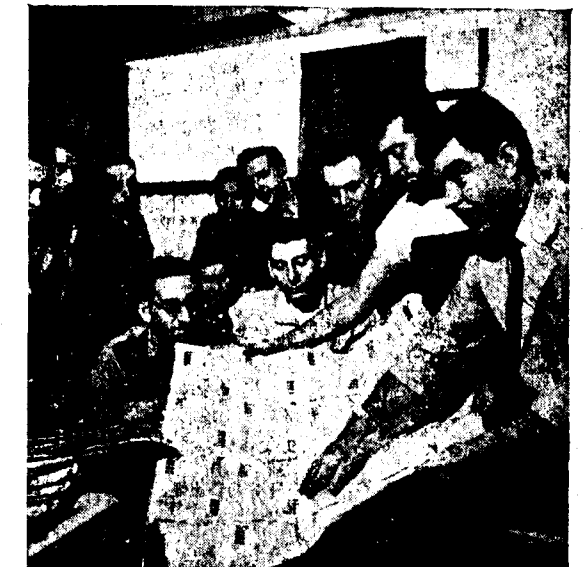
Here an instructor explains the operation of a two-color Miller printing press to a group of students.

The secondary school department is part of the city's public school system. It gives instruction in shop subjects—type composition, presswork, platemaking, photoengraving and bookbinding—as well as the regular academic course.

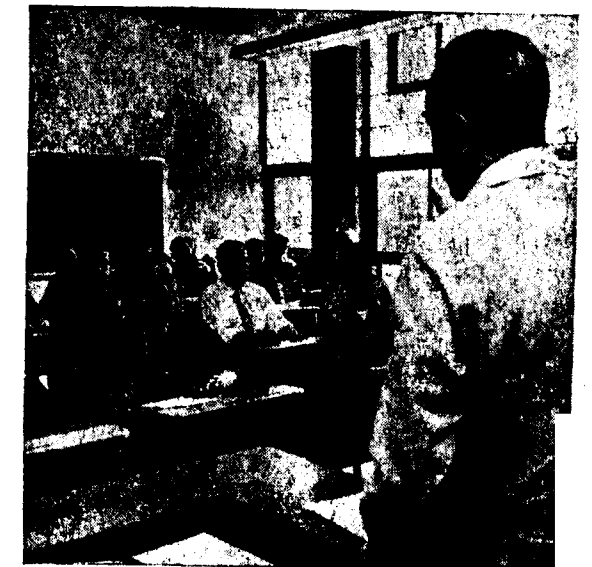


Instruction in the use of a proof press and what to look for in checking a proof sheet is an important part of the training programme.

The apprentice department functions for the supplementary training of young men who are in the trade and are working toward their



Instructor Joseph Rubino (far right) points out to a group of apprentices some of the technical problems in producing this sheet of commercial labels.



Shop training is supplemented by classroom lecture and discussion. The printing eachers all have practical backgrounds in their trades, many working part time at the school while employed in the industry.

JUNE 1959

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journeyman status. Union contracts call for a specified number of hours per week for apprentice school attendance.

The school is operated under the jurisdiction of the Board of Education of New York City. Its printing teachers all have practical backgrounds in their trades, many working part time at the school while employed in the industry.

Advisory boards of the School are drawn from representatives of education and employers and unions in the printing crafts. The industry lends financial as well as advisory support, and contributes much of the equipment and materials required.

The New York school of Printing was founded some 45 years ago as a vocational school in typographical composition. Through

the years, it has grown steadily in scope and stature until today its method of operation is regarded as an ideal example of vocational-academic education and apprentice training for young men. It has served as a model for such schools throughout the country, not only in the graphic arts but for other trades as well.

It has a record of 100 percent job placement of its secondary school graduates over its entire history. In addition, many of the graduates go on to higher education, majoring in printing management at colleges and other institutions.

The Key to the school's success, according to those who have been in close touch with its operations, lies in the administrative cooperation between the city's public school system and the printing industry itself, represented by both labor and management.

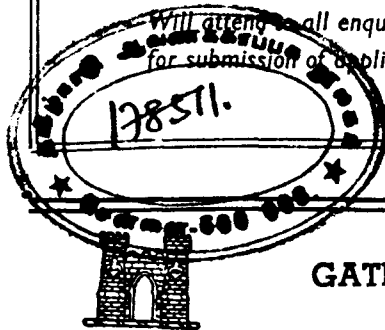
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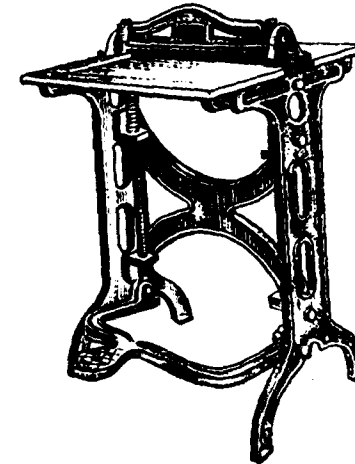


The Cover of this issue is printed on
GATEWAY PAPER, "Proven" White Art
Double Crown, 45 lb., 500 sheets



TREADLE PERFORATOR

Size 18 inches

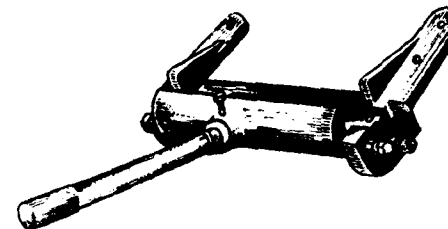


This is designed for efficient and neat working. All components are accurately machined. The machine is fitted with tempered English pins.

The tables of highly polished wood are provided with side and back guages.

CALENDAR RIMMING MACHINE

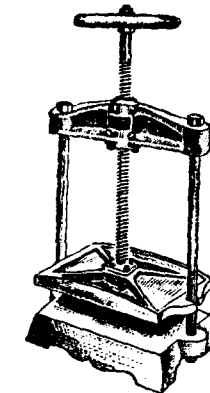
Sizes 18 and 24 inches



This machine is useful to Printers, Show Card and Calendar Makers etc. for fixing Metal Rims and Suspenders to Calendars, Maps etc. The Machine makes single and double folds.

HARD PRESS

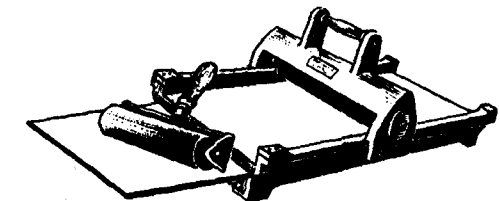
Sizes 12" x 18" and 15" x 20"



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Size of Bed 13" x 32" Size of Galley 12" x 24"



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రంభం కరిష్యామి సిద్ధిర్భవతుమే సదా! వద్యవ్రత

No. 452

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