

The TABULATOR

No 77

A JOURNAL DEVOTED TO HOLLERITH PUNCHED CARD ACCOUNTING





**Chairman,
Hollerith
(India)
Limited**

SIR VITHAL NARAYAN CHANDAVARKAR

SIR VITHAL N. CHANDAVARKAR, Chairman of Hollerith (India) Limited, was born on November 26, 1887. He is the son of the late Sir Narayan Chandavarkar, who was one of the most distinguished Indians of his generation. Sir Narayan was President of the Indian National Congress (1900), Judge of the Bombay High Court, Vice-Chancellor of the Bombay University, Prime Minister of Indore State, and the first Speaker of the Bombay Legislative Assembly constituted under the Montague Reforms.

Sir Vithal Chandavarkar took his degree at Cambridge University (King's College) in mathematics, science, history, politics and international law. He was called to the English Bar in January 1913 (Lincoln's Inn). After his return from England in October 1913, he practised as a member of the Bar in the Bombay High Court for nearly six years. In February 1920 he joined the firm of Messrs. N. Sirur and Company, cotton textile mill agents, became Chairman and Managing Director of this company in April 1937 and continues to occupy this position. He is a Director of the Imperial Bank of India.

Sir Vithal became a member of the Bombay Municipal Corporation in April 1926 and was elected Mayor of Bombay in 1932. In April of the following year he was appointed Vice-Chancellor of the University of Bombay, an office in which he continued for six years.

Politically he is a member of the Indian Liberal Party, and was President of the Session of the Indian National Liberal Federation held at Calcutta in December 1940. He was a member of the

Bombay Legislative Assembly in 1933 and of the Indian (Central) Legislative Assembly from 1941 till 1945.

In 1933 also Sir Vithal Chandavarkar was elected a member of the Millowners' Association of Bombay, an important organisation which controls more than 50 per cent. of the textile industry in India. Deputy Chairman of this Association in 1935, he first became its Chairman in 1936. Since then he has been recalled to the office of Chairman eight times and has been Deputy Chairman three times.

Sir Vithal was President of the Rotary Club of Bombay in 1942-43. He has been intimately connected with scientific development in India through his association with the Victoria Jubilee Technical Institute, the Department of Chemical Technology, the University of Bombay and the Indian Institute of Science, Bangalore. (He has been a member of the Governing Council of the Institute since 1935 and its Chairman since August 1947.) Bombay claims a large share of his interest and he is Chairman of the Bombay City Branch of the Indian Red Cross Society, as well as of the State Council of Technical Education.

Sir Vithal N. Chandavarkar married in June 1914, Vatsalabai, third daughter of the late Rao Saheb M. V. Kaikini of Karwar (North Kanara). He has two sons and two daughters. Lady Chandavarkar is keenly interested in social work in the City of Bombay and is actively associated with various institutions working for the welfare of women and children.

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No. 77

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EDITORIAL

IT IS THE COMMON lot of parents everywhere to see their sons grow to man's estate. Fortified by the knowledge and experience imbibed during the years of parental supervision, youth cannot indefinitely be denied the right to exercise a larger measure of personal responsibility.

The fact that the younger generation is able and willing, anxious indeed, to make its own decisions and to set its own course for future achievements is a source of gratification, just as the new situation, the establishment of an additional household, means a change in the pattern of both lives, which has in it an element both of pride and regret.

The British Tabulating Machine Company has for more than a quarter of a century nursed and directed its offspring in India. Now, with the inauguration of Hollerith (India) Limited, the parent Company is able to take proper pride in the logical fulfilment of its efforts.

The "family" has enlarged its sphere of influence by the enhanced status of one of its members. The establishment of this new Company is the consummation of years of devoted interest to the special needs of the Indian continent and the Far Eastern market. The rapid progress of Hollerith in India may with justice be ascribed as much to the care and unremitting attention given to the organisation during its early formative years as to the recognition of its value—recognition earned by its contributions to efficient industrial and commercial management and control in the East.

Hollerith in India has developed along the same lines as its parent. The family resemblance is unmistakable. It has advisory teams of investigators, accountants and technical experts, all thoroughly competent and experienced representatives, whose privilege it is to provide for each user economical, "tailor-made," punched card equipment and the detailed operational programmes for its efficient use. It has built up its own teams of trained service engineers, fully qualified and competent to provide the high standards of mechanical service which it has always been the policy of the parent Company to offer to Hollerith users.

Instructional facilities are available for customers' own staffs wherever these are needed, and the principal Educational Centres in Bombay and Calcutta are equipped for the provision of regular instructional

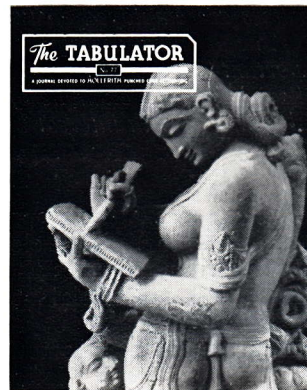
courses modelled on the most up-to-date patterns. Training can also be given at other centres in India, as well as in Pakistan, Ceylon, Burma and the Far East. There are no language difficulties—Hollerith punched cards speak a universal language.

Behind these very considerable resources of Hollerith (India) Limited there still stands the vast wealth of knowledge and experience of the parent Company, able and anxious at all times to lend assistance, to pass on the benefits of research as well as details of all new developments, and to supply the answers to any unusual engineering or technical problems should these arise.

Hollerith customers in India will now enjoy the double advantage: they will have their own Company, under the direction of one of their own countrymen, with which to discuss their specialised requirements, and the parent Company in England ever watchful over their interests, as of all Hollerith users, to secure for them the best possible service both now and in the future.

The British Tabulating Machine Company Limited conveys to Hollerith (India) Limited earnest good wishes for a prosperous future and one which will always be profitable to both parties to the Hollerith contract. For the measure of success in providing mechanised punched card accounting machines is inevitably directly and proportionately related to the satisfaction of the user and the confidence he continues to enjoy in the Company providing him with his office equipment and service.


OUR COVER



A fine example of early Indian sculpture, one of many interesting examples of the high standard of artistic expression to be found in a country richly endowed with the treasures of an ancient culture.

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WEAVING RECORDS



The Bangalore Woollen, Cotton and Silk Mills depend for their efficient management upon the satisfactory solution of problems which are common to the textile industry everywhere. Among the principal ones are those attaching to a delicate and ever-shifting wage structure, based in part on fixed basic rates allied with piece-rate supplements, and the computing of these in relation to different types of machines and many varied processes. The control of production at all stages of manufacture is imperative.

One of the largest composite mills in South India, producing woollen fabrics, cotton shirtings, rugs, blankets, silk georgettes, gold lace sarees, etc. Eight thousand workers are employed on two shifts.

The ensuing description of Hollerith Punched Card applications in use by this important Textile Mill reveals certain conditions peculiar to industry in India; but it is believed that this example of the profitable use of mechanised punched card accounting will be noted with interest by textile managements all over the world.

IN THESE BANGALORE MILLS cotton is processed from the raw cotton bale to the finished cloth. Similarly, for wool and silk the mill undertakes all the processes needed to transform the raw material into the finished article.

The complexities inseparable from the variety of operations to be accounted for in relation to so many different machines and processes made the decision to mechanise the accounting procedure a momentous one, and the outcome correspondingly gratifying.

Mechanisation was effected in stages:

Phase 1. All Wage calculations by each Department in turn, commencing with Carding and Spinning.

Phase 2. All Productions and Efficiencies, by Departments, as above.

Phase 3. Stores Accounting.

A necessary preliminary was the allocation to each

worker of a code number consisting of five digits—the first two digits identifying the Department or Section in which the employee is engaged. These workers' code numbers are necessarily changed on transfer to other Departments.

A second—permanent—identification number is allotted to each worker for use in connection with Personnel Records: Provident Fund, Gratuity Fund, Leave, etc. A manual record system links the two numbers.

Wages fall into three categories:

- (a) Daily Time Work wages.
- (b) Piece-work wages.
- (c) Monthly Time Work wages. (Applicable to office staff and certain special classes of employees.)

The wage structure is, for the classes mentioned:

- (a) Fixed basic wage plus percentage increment according to service.

SPECIMEN OF COMPLETED ATTENDANCE REGISTER

Designation	Worker No.	Name	Daily attendance	Rate of pay	Service percentage	Day work time	Piece work time	Privilege leave	Ordinary leave	Sick leave	Absent days	Accident leave	Overtime days	Night Shift (days)	Total days for %
	28001	Krishnan		1-12-6	8	2	23	1	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{2}$		4	12	$7\frac{1}{4}$
	04050	Ranganna		1- 0-6	9			3						12	3
	05060	Muniyan		1- 8-0	6	20								11	20
	12131	Madiah		1-10-0	7	20		$1\frac{1}{4}$	$\frac{1}{2}$	$2\frac{1}{2}$	$\frac{3}{4}$		3	10	$25\frac{1}{2}$

- (b) Earnings according to production, plus service percentage. (Fixed basic job rate—used only in connection with privilege leave and sick leave.)
- (c) Monthly rates, plus increments according to scale.

Conditions of employment comprise:

Privilege Leave on full pay. Minimum leave permitted is $\frac{1}{4}$ day.

Ordinary Leave with Dear Living Allowance only.

Sick Leave with maximum period entitlement and payment at half basic rate, plus Dear Living Allowance.

Overtime: At special rates.

Night Shift Allowance.

Dear Living Allowance.

Deductions comprise:

Provident Fund contributions.

Purchases of rations and commodities from Work-people's Store—payments for credit purchases.

Occupation Charge due from workers living in Company houses.

Savings Fund contributions.

Fines.

Daily Time workers may be employed on several jobs for which different basic rates apply, and gross wages must be adjusted accordingly.

Pieceworkers may be employed on different types of work during the period, and in these cases wages must be calculated according to production output.

The Time Section maintains attendance registers and at the end of each month passes on to the Hollerith section the following information for each worker:

No. of Days :—

1. Present.
2. On Privilege Leave.
3. On Ordinary Leave.
4. On Sick Leave.
5. Absent.
6. On Time Work.
7. On Piece Work.
8. On Night Work.

When an employee has worked on several jobs for which different rates of payment apply it is the responsibility of the Departments concerned to advise the Time Section, which then records the different rates to be paid, adjusts the Service Percentage and notifies the Hollerith Section.

Number of days "acting," as this situation is termed, are deducted from the total number of days shown in the attendance register and are separately recorded in the Acting List. Illustrated are specimens of completed Attendance Register and of Acting List.

For the actual printing of the Payroll and Payslips up to six Hollerith cards are used, according to circumstances, viz.:

- (1) Time and Establishment card.
- (2) Time and Establishment Acting card (if any).
- (3) Day Work Wages card.
- (4) Day Work Wages Acting card (if any).
- (5) Total Wages card.
- (6) Deductions card.

The contents of these cards are shown in detail overleaf.

The basis of the system is, however, a standing file of Master Cards, which are not themselves used for the actual printing of the payroll. These cards are maintained to carry in punched form the identification particulars of each employee together with "permanent" information relating to his pay entitlements, such as rate, service percentage, etc.

The first step in the production of the payroll is the automatic reproduction by Hollerith Reproducer of this Master Card file, for the creation of Time and Establishment cards by the subsequent hand punching and verifying of the detail obtained from the Attendance Register. These cards, now containing some of the additional information required for wage cal-

SPECIMEN OF ACTING LIST

PERMANENT		Name	Worker No.	ACTING			
Rate of pay	%			Designation	Rate of pay	%	No. of days
1-12-6	8	Krishnan	28001	Piece work	8	23	
1-0-6	9				Ranganna	4050	1-2-6
		Muniyan	05060	1-7-0	6	$\frac{1}{2}$	
1-8-0	6				1-12-0	5	5

A

TIME AND ESTABLISHMENT CARD

"ACTING" CARD

- Name
- Personal Number
- Rate of Pay
- Piece-work Time
- Day-work Time
- Privilege Leave
- Ordinary Leave
- Sick Leave
- Accident Leave
- Overtime [days]
- Night Shift

B

DAY WORK WAGES CARD

"ACTING" CARD

- Date: Month and Year
- Worker Number
- Service Percentage
- Day-work Wages
- Privilege Leave Pay
- Overtime Pay
- Sick Pay
- Accident Pay
- Time Absent
- Night Allowance

C

TOTAL WAGES CARD

(SUMMARY)

- Personal Number
- Piece-work Wages
- Good Piece Bonus
- Service Percentage [Amount]
- Gross Wages
- Wages for P.F.
- Provident Fund

D

DEDUCTIONS CARD

(SUMMARY)

- Savings Fund
- Workpeople's Stores
- Departmental Fines
- Rent
- Drama
- Total Deductions

A	NAME				Rate of Pay	P. W.
B	MTH.	DATE	YEAR	Worker No.	Ser %	
C						
D						Savings
A	KRISHNAN				30 50 B	1126
B	01	51	28	001	08	23
C	3050					
D	B					5
THE B. W. C. & S. MILLS CO., LTD.						
A	NAME				Rate of Pay	P. W.
B	DATE	Worker No.		Ser %		

PAY

OVER 40 ITEMS OF PAY DETAIL AND DEDUCTIONS

The Payslip illustrated above comprises more than thirty items and there is still room for more—ten more, if necessary.

The Employer has every aspect of the pay structure entirely under control, for analysis, comparison and every accountancy need.

The Employee knows to the last pie exactly how his pay packet is made up. Every item is clearly shown.

Pay	P. W. Time	Day Work Time	Privilege Leave	Ordinary Leave	Sick Leave	Acc. Leave	O. T. Days	Night Shift
		Day Work Wages	Pr. Leave Pay	Overtime Pay	Sick Pay	Acc. Pay	Time Absent	Night Allce.
		P. W. Wages	Good Piece Bonus	Ser. Per.		Gross Wages	Wages For P. F.	Prov. Fund
	Savings Fund	W. P. Stores	Deptl. Fines	Rent	Drama	Total Dedns.		Net Due
2 6	2 3.	2.	1.	¼	½		4.	1 2
		3. 9.0	1. 1 2.6	7. 2.0	7.6		½ 0.0	1 2.0
		4 0. 0.0	3. 2.0	4. 7.9		6 1. 4.9		4. 9.6
	5. 0.0	2 5. 1 2.6	2.6	5. 8.0		4 1. 0.6		
								2 0. 4.3+

**NET
WAGES
DUE**

culations, are themselves reproduced to provide a duplicate set of cards in which Service Percentage calculations are recorded.

Wage Computation

The Time and Establishment card now becomes known as the Interim Wages card, and is passed through a series of sorting and gangpunching operations during which all calculations relating to time work, sick leave, privilege leave and night shift allowance and overtime are gangpunched into these cards.

It is now necessary to consolidate the information thus recorded. The Interim Wages cards are sorted along with the Acting cards (if any), the Total Piece-work cards (if any), and the Service Percentage cards referred to above. After sorting in the required sequence all these cards are brought to the Tabulator and, in one operation, a control tabulation is made and, by means of a linked Summary Punch a set of summarised Total wages cards—one for each worker—is automatically punched.

A special file of Provident Fund Master cards is maintained in the same way as the Master Card file previously referred to. These cards are now associated with the Total wages cards to enable, by gangpunch operation, the amount of the Provident Fund, where this is applicable, to be transferred as punched recording in the Total wages cards. (If a worker is in the Gratuity Fund his card is kept on one side during the Provident Fund gangpunching operation, as the Gratuity Fund does not affect wages.)

Deductions

It remains now to produce the summarised Deductions cards. These are obtained by associating three cards:

(a) The Workpeople's Stores debits. (The amounts of purchases are notified and punched in cards daily.)

(b) Fines. (Details are obtained and cards are punched at the month end.)

(c) Provident Fund contributions.

Charges for house occupation and savings fund contributions are also incorporated in these cards. The summarised Deductions cards are obtained by the same operations as the Total Wages cards—viz., by Tabulator and Summary Punch production of tabulated control statement and summary cards.

The illustration on page six shows the association of the Payroll and Payslip production cards and the result obtained by tabulating the Payslip in which appear (in the example given) no fewer than thirty separate items of information, and as many as forty-five can, if necessary, be accommodated.

Wage Tabulations

The Payslip carbon copy—which is perforated—is issued to the worker and surrendered on receipt of wages.

After the Payroll and Payslips have been completed the same cards are again tabulated, after sorting as required, in order to obtain Wages Analysis, Deductions Analysis, Absenteeism Statement and other information needed from time to time by the management.

Piece Work, Production and Efficiency

In any manufacturing organisation where large numbers of machines and many different processes are employed, control of production at all stages is imperative. This is especially applicable in textile manufacture, where many of the machines also are well suited to piecework methods of payment. Drawing, Combing, Fly frames and Winding are all operations to which piecework rates of payment can be suitably applied. At the Bangalore Mills rates and

23		020		23165		30/12/50	
DEPT.		FRAME No.		WINDER No.			
CODE		0411					
QUALITY & COUNTS		SPINDLES		RATE		P.W. RATES	
Grey 11 ^s		10					
Cheeses		Average Pay		TOTAL POUNDS		FRAMES	
Doffs		27 27 23½		WINDING		WINDER No.	
				DAILY PRODUCTION CARD		CODES	
Date		Dept.		Calc. Pro.		SPINDLES	
						LBS. 1 2 3	
						LBS. LBS. LBS.	
						TIME FCY	
						AVERAGE	
						ATTENDANCE	
						PERCENTAGE	

THE BRITISH TABULATING MACHINE CO. LTD., 17, PARK LANE, LONDON W.1. PRINTED IN ENGLAND PC 36

Dual purpose card from Winding Department shows production of Winder No. 23165.

amounts are calculated on Hollerith machines, together with efficiencies per operative, frame and quality.

Production Control

For the purpose of recording productions the Dual Purpose Card above has been found to be the most convenient and economical medium. The card shown is that for the Winding Department, and the procedure described below follows substantially the same pattern in other production departments. The procedure is

represented diagrammatically on pages ten and eleven. The Department weighing clerk weighs each doff or can of wound yarn brought by the winder and enters the particulars on the Hollerith card. At the close of the shift all these cards are sent to the Hollerith section for totalling the doffs and gang-punching the rate for the particular count. The total pounds are afterwards multiplied by the rate to show the worker's piecework earnings for the card, which, in most cases, is for the shift. Each day the cards are listed and the lists are posted in the respective depart-

SPECIMEN OF SPINNING DAILY PRODUCTION STATEMENT
DAILY SPINNING REPORT

Date..... Shift.....

Quality and count (alpha)	Daily wrapping	No. of spindles working	Yarn spun	Hanks	Ozs. per spindle
		*Total No. of spindles working	*Total yarn spun	*Total hanks	
STOPPAGES					
	Reason code	Spindles stopped			
				Average frames	
				Average counts	
				Average ozs. per spindle	
				Average strength of 19s twist	
				Average count of 19s twist	
	TOTAL		*		

SPECIMEN OF PICKS RECORD BOOK

Date	LOOM NO. 336				LOOM No. 337				LOOM No. 338				Weaver No.	Time worked	Asst. Weaver No.	Time worked
	Picks woven	Picks allowance	Time stopped	Reason m/c. stopped	Picks woven	Picks allowance	Time stopped	Reason m/c. stopped	Picks woven	Picks allowance	Time stopped	Reason m/c. stopped				
	843				700				834				28337			
	803				753				743				"			
	748				611	149	1/4	7	250	510	1/2	0	"			
	778				714				705				31126			
	795				720				808				28337			
													31126			

ments so that the workers know daily their previous day's earnings.

At the month end all the cards relating to each worker are passed through the Tabulator and linked Summary Punch to create single summarised cards for each employee, representing the total piecework earnings for the month.

Efficiencies

Efficiencies are arrived at by punching the 100 per cent. efficiency rating into the card. When the cards are tabulated the actual efficiency is worked out by comptometer. Monthly total production results by quality are obtained at the same time.

In the Carding processes all the frames are provided with hank indicators which are read at the close of shifts. For Spinning total productions the procedure is exactly the same as for Winding, and a Specimen Daily Spinning Production Statement is shown on page eight.

Production statistics and efficiencies for Warping

and Sizing are calculated from the basic information supplied daily by the Sections. The looms are equipped with pick indicators and each day the Department advises the Hollerith section the picks produced per loom, the quality working, and any changes from the normal weaver and assistant employed in each case.

Specimen extracts from the Picks Record Book is shown above.

Production Records

To assist in obtaining a punched card record of this production a Master Card File is maintained. This comprises a Master Card already punched with "permanent" and identifying information, one card being set up for each loom. It contains details of loom number, permanent weaver and assistant's numbers, 100 per cent. production in picks, quality working code number, Side Jobber's and Head Jobber's numbers, loom width, type of loom, etc. A Specimen Cotton Weaving Daily Production card is illustrated below.

CLASS OF CARD	DATE	DAY SHIFT OR NIGHT SHIFT HEAD JOBBER'S SIDE JOBBER'S SIDE	LOOM NO.	LOOM WIDTH	CLASS OF WEAVER	BOOK AND SERIAL No.	QUALITY		GOOD PIECE BONUS CODE	PERMANENT WEAVER No.	PERMANENT ASST. WEAVER No.	PICKS WOVEN	PICKS ALLOWANCE	TIME STOPPED	SUBSTITUTE WEAVER No.	SUBSTITUTE ASST. WEAVER No.	PIECES	LBS.	REASON M/c. STOPPED	TIME M/c. STOPPED	100% PRODUCTION	GOOD PIECE BONUS	
							ALPHA	CODE															
1																							
2																							
3																							
4																							
5																							
6																							
7																							
8																							

COTTON WEAVING DAILY PRODUCTION CARD

"HOLLERITH" THE BRITISH TABULATING MACHINE CO. LTD. 17, PARK LANE, LONDON W1 PRINTED IN ENGLAND

Specimen cotton weaving production card to contain details of daily output from one loom.

PRODUCTION

DUAL PURPOSE CARDS

CARD DAILY PRODUCTION
SPINNING DAILY PRODUCTION
WINDING DAILY PRODUCTION

COTTON WEAVING DAILY PRODUCTION CARD

Automatic reproduction of these cards provides, for each shift, sets of basic cards into which it is only necessary to hand-punch the picks produced during the shift with adjustments for any changes in quality, for example, or in weaver. These shift cards are then tabulated to obtain production figures related to weavers, jobbers, qualities and types of loom.

In addition to the information mentioned, Grey warehouse production and loom stoppages are also punched into these cards, and statements by quality of actual looms working, pieces, pounds and picks produced are also obtained. An analysis of stoppages by causes is also made.

Summarising Information

In order that fortnightly, monthly, half-yearly and yearly statements shall be readily available on due dates the Tabulator with linked Summary Punch is brought into use to obtain in a convenient and immediately accessible form summary cards for tabulation in respect of each of the periods mentioned.

The Weaving Production cards are later used for working out weavers' and assistant weavers' wages. These Production cards are summarised by worker at the end of the first twenty days of each pay period and at the month end for the remainder of the account.

Other cards summary punched at the time of tabulating are employed for calculating jobbers' production and piecework earnings, and daily and monthly efficiencies.

Statistical Analyses

In all, as evidence of the quantity and quality of information available to the Bangalore Mill management from the punched card applications now in use, the following details of information provided for the

Weaving Department will be of interest:
Statements showing—

- (a) Average picks per loom*
- (b) " " " Jobbers (Side)*
- (c) " " " Head Jobbers*
- (d) " " " Quality*
- (e) " " " Weaver*
- (f) " " pieces per Quality per Loom*
- (g) Total pieces and yards per Quality*
- (h) " " weight woven by Quality and for the Shed*
- (i) Average pieces, yardage and weight per loom*
- (j) Piece work earnings of weavers, assistant weavers and jobbers, with monthly and six-monthly averages.
- (k) Efficiency by Quality and overall efficiency.

(* per day per month)

All other piecework and producing sections are calculated and controlled in a similar manner, and routine accountancy procedures are established for such sections as Twisting and Drawing, Baling, damage accounting, etc.

The final punched card mechanisation of this large undertaking is not yet completed. The extension of the system is intended to include complete Stores Accounting, control of cotton stocks and finished cloth bales and accounting for the Workpeople's Stores supplying some seven thousand customers.

These projects are for the immediate future, but in a manufacturing organisation of this size and importance, and one with so large and comprehensive a production programme, the adoption of punched card accountancy methods is likely to be extended still further. Having regard to the early association of punched cards with the textile industry in the form of the punched paper pattern of the Jacquard loom, it may not seem inappropriate that these modern aids to efficient management are to be found assisting the industry in which their own origin is to be traced.

- Looms are equipped with pick indicators. The Hollerith section is advised by the Picks Record Book of the number of picks produced per loom, the quality working and the identification number of weaver and assistant weaver concerned. (Specimen of Picks Record Book is shown below and on page nine.)

A Master Card file is maintained composed of cards already

punched with "permanent" and identifying information—viz.: number, type and width of loom, weavers' and assistants' numbers, 100 per cent. production in picks, quality code, Side and Head Jobbers' numbers, etc. These Master Cards are machine reproduced for each shift, and the only hand punching required is the actual picks produced, or for adjustments due to changes in qualities or in operators.

- Each doff or can of wound yarn is weighed and the Department Weighing clerk enters the particulars on the Hollerith Dual-Purpose card. The Hollerith machine section totals the doffs, gang punches into the cards the rates for the particular counts, multiplies the weights (lbs.) by the rates and obtains the amounts of workers' piece-work earnings and their efficiency records. These are listed in the Daily Report and Monthly Summary.

Earnings and efficiencies are similarly obtained for Carding and Spinning productions. Warping and Sizing Departments also supply daily the information to enable production statistics and efficiency calculations to be made. [Specimen Daily Spinning Report is shown below and on page eight.]

PICKS RECORD BOOK

Date	LOOM NO 336				LOOM No. 337				LOOM No. 338				Weaver No.	Time worked	Asst. Weaver No.	Time worked
	Picks woven	Picks allowance	Time stopped	Reason m.c. stopped	Picks woven	Picks allowance	Time stopped	Reason m.c. stopped	Picks woven	Picks allowance	Time stopped	Reason m.c. stopped				
	843				700				834				28337			
	803				753				743				..			
	748				611	149	1	7	250	510	1	0	31126			
	778				714				705				28337			
	795				720				808				31126			

Quality and count (alpha)	Daily wrapping	No. of spindles working		Yarn spun	Hanks		Ozs. per spindle
		*Total No. of spindles working	*Total yarn spun		*Total hanks	*Total spindles stopped	
STOPPAGES							
		Reason code	Spindles stopped				
		TOTAL					
				Average frames			
				Average counts			
				Average ozs. per spindle			
				Average strength of 19s twist			
				Average count of 19s twist			

★

- From the sources named the output of all
- Piece-work and Producing Departments is calculated, analysed and controlled.
 - Punched cards and Hollerith machines supply an impressive range of production and accountancy statistics for all Departments.
 - As an example, the Weaving Department obtains no fewer than eleven different daily production and efficiency tabulations, as enumerated on page ten.

DAILY
14 DAYS
MONTHLY
6 MONTHS
YEARLY

} PRODUCTION RECORDS & STATISTICS

SIR VITHAL NARAYAN CHANDAVARKAR

Chairman, Hollerith (India) Limited . . .

. . . looks to the future

IT WAS WITH GREAT INTEREST that I learnt that after operating in India for some thirty years The British Tabulating Machine Company Limited had decided to entrust their business here to a local Company. I was honoured and pleased when I was asked to join the Board of the new Company and to become its first Chairman.

It was at the end of the nineteenth century that Dr. Herman Hollerith was engaged in research, experiment and finally with the production of the world's first office machines to be operated by Punched Cards. Progress in those early days was comparatively slow, but by the end of the first World War The British Tabulating Machine Company was well established and beginning to think about export markets. So in 1922 the first machines arrived in India and were installed in the offices of the East Bengal Railway. Much credit must be given to the Government officials of that time who had the courage and foresight to introduce what to them must have been entirely revolutionary methods.

Thirty years have passed since then and, apart from the impact of the second World War in which Hollerith equipment played a considerable part, India has seen tremendous changes. First came Independence in August, 1947—followed most unfortunately by tremendous social upheavals—and then the formation of the Republic in January, 1950. Steadily at first and much more rapidly in recent years, India's industrial capacity has been keeping

pace with the political events and expanding to a tremendous extent. Again the facilities supplied by The British Tabulating Machine Company Limited have played a significant part.

But it is to the future that my thoughts must now turn. What are India's greatest needs likely to be in the coming years and how can this new Company, Hollerith (India) Limited, help? There can be no doubt that the country's first objective must be to create conditions which bring about a steady improvement in the standard of living of its inhabitants; this, in turn, can only be achieved by an increase in productivity both in the agricultural and industrial spheres. There is today a sad lack of official statistics of real worth, and it may be that one of the greatest contributions to India's future which my colleagues and I can make is to assist in the compilation of figures which will in turn allow the best possible use to be made of the land which is available for cultivation. In the industrial field there is almost no limit to the ways in which we should be able to help—from the preparation of a work's payroll to the physical controlling of a flow of components to ensure accurate and speedy assembly.

I look forward with great confidence to the years ahead when Hollerith (India) Limited, supported by the full facilities of The British Tabulating Machine Company Limited in the United Kingdom, will play an ever-important part in the life and development of India.

V. N. Chandavarkar
(V. N. Chandavarkar)

HOLLERITH USERS IN INDIA WELCOME THE NEW COMPANY

Government Statistics

PROFESSOR P. C. MAHALANOBIS, F.R.S.

I WISH every success in your new undertaking. I had read about Hollerith machines long ago, and I had an opportunity of seeing them in operation for the first time in London when I was there on leave in 1926. Soon after my return to India I purchased one key punch and one verifier for the Statistical Laboratory. Your office in Calcutta had then started work on a small scale and was located in Stephen House in Dalhousie Square. I have an impression that we actually got some work done through your office on a service basis in those days. In any case, for more than a quarter of a century I have been consistently and steadily promoting the mechanisation of accounting and statistical work in India.

The Indian Statistical Institute has always been actively pursuing a policy of mechanisation. Many of the projects which the Institute undertook in the past and the large-scale work which the Institute is doing for the Government of India at present could not possibly have been handled without Hollerith equipment.

I am also eager that not only the Indian Statistical Institute but all large-scale enterprises—including Government Departments—should adopt a policy of mechanisation.

I congratulate the British Tabulating Machine Company Limited for the imaginative action they have taken in establishing an Indian Company.

*P. C. MAHALANOBIS
(Honorary Statistical Adviser to the Government of India).*

Associated Cement Companies Ltd. Headquarters in Bombay.



*Bombay Electric Supply and Transport Committee Central Depot
Bellasis Road, Byculla, Bombay.*

Modern Accounting Aid in a Growing Economy

BOMBAY ELECTRIC SUPPLY AND TRANSPORT COMMITTEE

IN A WORLD of competition new standards of efficiency are required, more facts have to be assimilated, quick decisions must be made and applied in the minimum of time. To achieve these results the machine becomes a vital aid to the management and administration of business concerns.

Hollerith methods of mechanising the working of various commercial departments of large concerns have considerably contributed to achieve this object. In this age of mechanisation Hollerith machines help keep pace not only with the demands of modern accounting, with its ever-increasing tempo and complexity, but also with the voluminous increase in work brought about by the rapid growth and expansion of large commercial undertakings.

I am happy to say that the B.E.S. & T. Undertaking has been taking good advantage of this system of mechanical working. It is a matter of great pleasure to learn that the Hollerith (India) Limited will henceforward be working in this country as an Indian concern. When industrial organisations are rapidly growing in this country and are expected to assume large proportions in time to come, mechanised methods of conducting commercial undertakings are bound to be useful and necessary even in their initial stages. I therefore hope and trust that, looking to the economic and other circumstances of this country, the newly born Hollerith (India) Limited will cater to the requirements of average commercial undertakings at as cheap a rate as possible, and make it possible for a large number of undertakings to take advantage of their methods and services.

*GORHANDAS G. MORARJI
(Chairman, B.E.S. & T. Committee).*

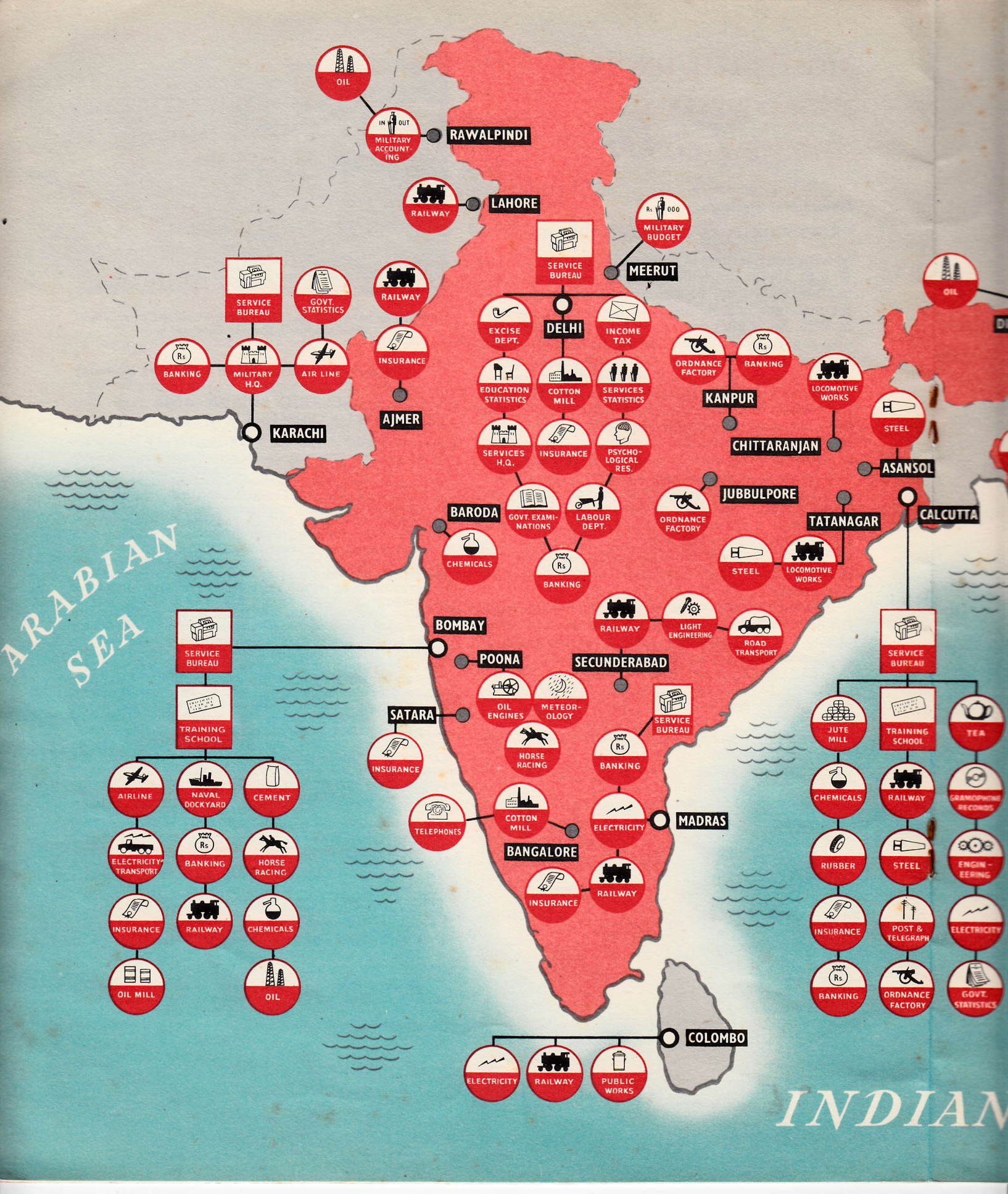
“A Step in the Right Direction”

THE ASSOCIATED CEMENT COMPANIES LIMITED BOMBAY

IT IS WITH pleasure we learn that you have decided to form an Indian Company to take over the entire business of your concern in this country.

As users of Hollerith Accounting Machines for the last thirteen years we are happy to note that expansion of your business activities necessitates the formation of Hollerith (India) Limited, which we feel is a step in the right direction

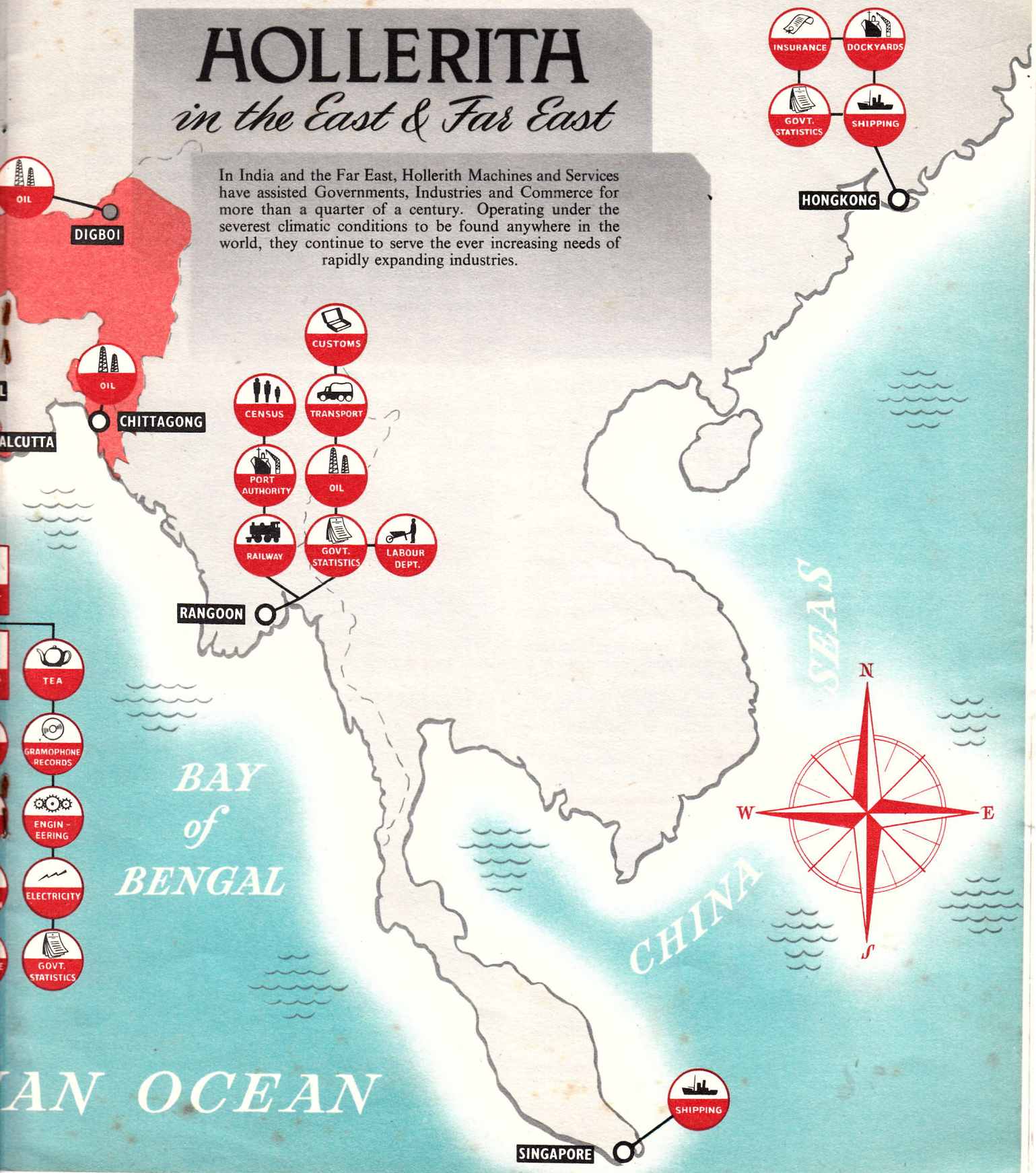
*H. S. HIRJEE KHORSHED
(Chief Accountant).*



HOLLERITH

in the East & Far East

In India and the Far East, Hollerith Machines and Services have assisted Governments, Industries and Commerce for more than a quarter of a century. Operating under the severest climatic conditions to be found anywhere in the world, they continue to serve the ever increasing needs of rapidly expanding industries.



- INSURANCE
- DOCKYARDS
- GOVT. STATISTICS
- SHIPPING

HONGKONG

- CUSTOMS
- CENSUS
- TRANSPORT
- PORT AUTHORITY
- OIL
- RAILWAY
- GOVT. STATISTICS
- LABOUR DEPT.

RANGOON

BAY of BENGAL

CHINA



INDIAN OCEAN

SINGAPORE

- SHIPPING

- OIL

DIGBOI

CALCUTTA

CHITTAGONG

- TEA

- GRAMOPHONE RECORDS

- ENGINEERING

- ELECTRICITY

- GOVT. STATISTICS



New India Assurance Building Bombay.

New Problems of Insurance Administration

NEW INDIA ASSURANCE COMPANY LIMITED BOMBAY

WE ARE PLEASED to know that the British Tabulating Machine Company Limited, who have been operating in Bombay for nearly thirty years, are forming a local Company, the Hollerith (India) Limited. We readily join other users of Hollerith in wishing this new venture a great success.

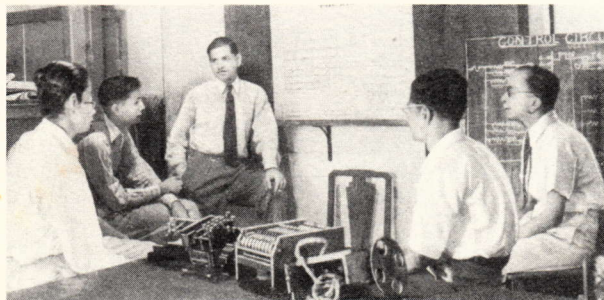
During the last decade people in India have become more and more insurance-minded, with resultant expansion in life insurance business. This expansion would normally create new problems of administration and administrative control. It is only by introducing the modern methods of mechanised accounting that these problems have been effectively tackled.

The step taken by the British Tabulating Machine Company Limited in forming an Indian Company is a progressive move in the right direction.

Once again we greet the new Company heartily and wish it the most successful and serviceable role in the rationalisation and mechanisation of administrative procedures in this country.

*B. K. SHAH,
(General Manager).*

First Mechanical Training School in India.



Thirty Years' Service

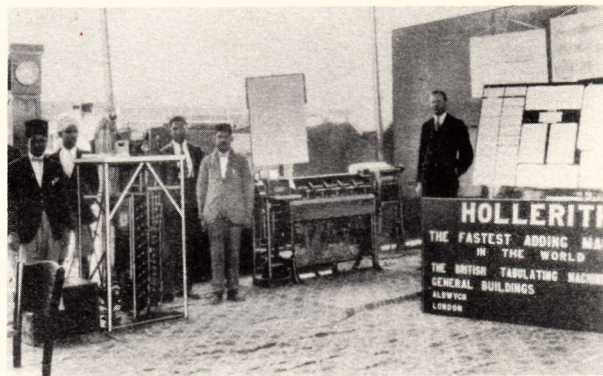
SOUTHERN RAILWAY.

THE SOUTHERN RAILWAY (recently formed by integrating the ex-Madras and Southern Mahratta, South Indian and Mysore State Railways) has been regularly using for nearly three decades now Hollerith Machines obtained from The British Tabulating Machine Company Limited. During this period these machines have been utilised extensively for statistical analysis, accounting and other tabulating work. I am glad to say that the machines have given consistently good service throughout this period.

I am pleased to hear that a Company is now being formed in India under the name "Hollerith (India) Limited," to look after the interests of Indian customers better. I take this opportunity of wishing the new undertaking every success. With the long tradition of good service of the parent Company behind it and the constant work that is being put forward by the technicians of the joint undertaking, I feel sure that the products of the new Company will give better and better service to the Railway in future also.

*K. R. RAMANUJAM,
(General Manager).*

First Hollerith Exhibition in India.



First Majority Club Member in India (J. L. Handa).



INDIAN BALLET . . .

. . . is founded
on a strictly
traditional code

By S. M. SHRINAGESH

THE CURTAIN RISES on a darkened stage. The platform is bare, the back-cloth simple. A single spotlight picks out a solitary figure in yellow and gold, poised motionless like a statue, body, arms and legs held in a posture reminiscent of the ancient bronzes of South India. Outside the reach of the spotlight, almost hidden in the wings, two or three white-clad figures are seated cross-legged on the floor. Then, the dull throb of a drum, the plaintive twang of strings and the bronze statue comes to life, executing rhythmic, exquisitely conceived movements, rich in grace and eloquence, strange in form and technique.

Once, not very long ago, such a spectacle was exotic and sensational. Western audiences were unaccustomed to see, in what was evidently a serious dance, muscles rippling along motionless arms, eyebrows moving as nimbly as the dancers' eyes, hand movements of extraordinary delicacy and precision. No wonder that all this seemed very strange to the uninitiated. It is not surprising that when these dances were first presented in the West onlookers were sometimes doubtful whether they should laugh or applaud.

Today it is no longer a novelty to see an Indian dance on a British stage. Indian dancing is now accepted as a rich experience; one to be understood and one to be appreciated by a public becoming more and more conscious of its particular merits.

The credit for this transformation, for transformation it is, is due to the many Indian dancers who have performed in Britain during the past twenty years. Among them have been the best of India's dancers, and it is their performances which have done so much to familiarise Europeans with an art completely alien to the Western mind both in medium and in technique.

An Intimate, Devotional Art

It would be difficult to pick out the most outstanding among these dancers. Each excels in his own particular sphere. But Uday Shankar must come first on the list because he, perhaps more than anyone else, popularised modern Indian dancing, not only abroad but also at home. It was Uday Shankar who first opened the strange new world of Indian dancing to the West, and in doing so he



KRISHNA KUTTY is the only male dancer in the Indian Ballet now in Britain.

gambled bravely. In those days there were people, even in his own country, who were prepared to ridicule his attempts to stage an Indian ballet. Dancing for them was an intimate, devotional art, not an exhibition for public performance.

It is true to say that the whole conception of Indian dancing has changed in recent years. At the beginning of the century it would have needed a bold spirit to forecast that dancing would ever become a popular art in India. It would have needed a still bolder spirit to prophesy that one day girls of good, decent families would be allowed to appear on a public stage.

This new outlook is due to men like Uday Shankar and to those who followed after him—Rukmini Devi, Mrinalini Sarabhai, Ram Gopal and Hima Kesarcodi among others.

There is a legend about the birth of the dance in India which is worth repeating, as it explains the significance and essentials of Indian dancing. The story goes that Brahma, the God of Creation, decided to create a new sciences. He chose the essentials from each of the four existing sciences or Vedas. He took the intellectual content from the Rig Veda, music from the Sama Veda,



ROSHAN VAJIFDAR in a *Marwari Dance*.

facial expression from the Yajur Veda and emotion from the Atharva Veda, and combined them to produce the fifth science, the Science of Dancing. From this beginning dancing grew to become, not the dance form as in the West, but a religious and traditional art in which the dancer is the worshipper. This attitude is still fundamental to Indian dancing. Its origins are to be traced to the dawn of Indian civilisation. The dance is fundamentally religious and devotional. It is an art whose basic movements adhere with scientific precision to a strictly conventional and traditional code.

This code is worked out with meticulous attention to minute detail. All Indian dancing is originally based on one or other of nine different traditional and classic moods, varying from the heroic to the comic. Just as poetry may be similarly classified, so in the dance the theme was expressed in one of these forms and developed by the rhythmic sequence of music, expression and hand gesture.

The language of gesture is the principal feature of Indian dancing. This language is remarkably comprehensive and eloquent, evocative rather than imitative, suggestive rather than enunciative. There are a host of gestures to express any mood, any shade of emotion, any action.

This explanation may tend to over-simplify an art which is above all else highly traditional and conventional.

To express it in another way, by comparing Western and Indian dancing, the difference between the two may be said to lie in the realisation of the idea. Both are made up of stylised movements, but in Western dancing the idea of the dance, whether pure or narrative, is projected on to the dancers by the choreographer, who uses the dancers to express *his* interpretation of an idea. The opposite is true of Indian dancing. The dancer has mastered a strictly traditional code, but within this he creates his own dance. The realisation of the idea is his. The dancer is the principal, music and performance revolve around him.

There are two main classes of Indian dancing, the classical and the folk. The first is highly stylised, highly sophisticated; the second is spontaneous, unsophisticated.

Four Main Schools of Classical Dancing

In classical dancing there are four main schools. The purest and the oldest in Indian tradition is the Bharata Natya of South India. This is usually a solo dance normally performed by women. It is supported by little décor and few costume changes, but, with its subtlety of gesture and mime, it is perhaps unsurpassed as pure dancing. Musical accompaniment usually consists of a single instrumentalist, or a group of singers and drummers—the song being the commentary of the dance recital.

In direct contrast, the Kathakali school of Malabar is the dramatic and narrative form of Indian dancing, more masculine, more virile. Kathakali, as its name implies, is a story-play; a dance drama, a pantomime of gesture and expression which are eloquent enough to be understood by everyone. Musical accompaniment consists usually of a singer, who sings the story enacted by the dancers, and two drummers. Although Kathakali uses a modified Bharata Natya technique, it is not a solo dance. It uses many dancers and many types, and it draws from the great Indian epics for its themes.

The other two schools of dancing are the Kathak of Northern India and the Manipuri of Assam. The Kathak school is especially interesting because in its complicated dance rhythms may be seen evidence of the earliest Indian culture; while the dresses and ornaments of the dancers derive from powerful Moghul influences. Against the elegance of the Kathak school, the Manipuri school is notable for lyrical beauty and fluidity. A Manipuri dance is easily recognised by the shimmering dresses of the women and the easy, liquid grace of their movements.

These are the essentials of Indian dancing. Until the beginning of this century they were left to the professional dancers, who performed under select and noble patronage in the intimacy of the temple or the palace courtyard.

Combining Old and New

Today Indian dancing has adopted the stage for its medium and is growing in popularity and public appeal everywhere. Though there are still purists among the dancers, those who follow only the classical traditional ways, there are many modernists and innovators. These are the dancers who seek to combine the old and new, who seek new solutions for the new problems presented

to them, and new subjects for new experiences. It is, however, one thing to perform in a temple courtyard, quite another to perform on a public stage.

Problems of Public Presentation

This transition has brought its own problems. The most important of these are related to the transformation of a dance from an intimate to a public art. Now, the dancer has to comprehend not only the requirements of his own art, but also the technique of its public presentation. This is where stage management, choreography and décor come in, none of which had such importance before. Once nothing else mattered but the dance; now its presentation is nearly as important as the dance itself.

All the Indian dancers who have performed in Britain will, I think, agree that this is their major problem in bringing a troupe to Britain. With so alien a medium the essential is not only to delight but also to explain.

There is a new Indian Ballet Company touring Britain at present. It has a single male dancer, Krishna Kutty, who has devoted his life to Indian dancing and is today one of the finest living exponents of classical Indian dancing, particularly Kathakali. The other three dancers are female, the three Vajifdar sisters, Shirin, Roshan and Khurshed. Shirin Vajifdar is one of the leading younger dancers of India. Their performances are sheer delight to watch. Here in combination are to be found graceful rhythmic movement, excellent choreography and décor for all lovers of the ballet.

Each performance is prefaced by an introduction. Such introductions have become almost a rigid formula in presenting Indian dances abroad. While it would be ideal if these introductions could be dispensed with, the time has not yet arrived when they will be superfluous, when, as in a presentation of "The Swan Lake," no introduction is needed. Shirin Vajifdar, perhaps, will



KHURSHED, another of the talented Vajifdar sisters, now appearing in London with the Indian Ballet.

stand in the wings before a microphone to explain the story the dancers are unfolding. A voice off-stage will speak of the emotions the dancer on the stage is expressing.

In Britain the problem is to merge the presentation, the introduction, into the ballet itself and preserve it from any tendency to become a lecture or tedious lesson.

Krishna Kutty and the Vajifdars provide excellent examples of the development of Indian dancing within this century. They mix the old and the new, they blend tradition with evolution. They are among the stars who are building a bridge between East and West. For dancing is one of India's greatest contributions to the art of the world. It carries with it the soul of India. Try to understand it and you are on your way to understanding India, a country in which art and religion, music and gesture, science and philosophy, are all blended with past and present, and whose history is vivid and colourful, woven into an intricate pattern like an oriental carpet.

UDAY SHANKAR and Company in Bhils Dance are depicting a quarrel between husband and lover over the bride.



WITH THE GOODS: THE SERVICE

NATIONAL FEDERATION
OF SHOPKEEPERS
(Derby Branch)

P. Brown, Esq.,
The Ceylon Tea Company Ltd.,
Derby. 27 March, 1952

Dear Sir,

At our meeting of yesterday I was instructed to write and compliment you on the new style of invoices now used by your firm. Every item being distinctly expressed in terms of cost price, selling price and profits should prove of great value to all retailers and cannot help but be appreciated by us all. The Committee felt that in these days of price changes the help given per your invoices will be inestimable to us all.

Yours faithfully,
(Sd.) G. SMITH (Mrs.)
Secretary.



THE CEYLON TEA COMPANY, DERBY, pioneer unique facilities for the small retail grocery shop and demonstrate a practical and realistic use of Hollerith for the small business.

HOLLERITH TERMS USED IN THIS ARTICLE

Punched Card Master Pulling File.

(i) MASTER CARDS

When a file of Hollerith punched cards containing basic "permanent" information is set up, such cards are available for use as Masters. In the application now described the Master Cards are permanent "ready reckoners." They hold the necessary information relating to quantity, description, unit of sale rate, suggested retail selling price (or controlled price), the amount of profit on selling price (also expressed as a percentage), and the calculated value; a series of similar cards is held for each normal quantity of each commodity.

The required Master Cards are "pulled" by reference to the travellers' order forms, and are thus made up into "sets" representing all the invoice items in each customer's order.

Each card already contains all the data needed to furnish an item line in the invoice. The Master Cards require to be replaced with new cards only when changes occur in prices or profits.

(ii) PULLING FILE

A file constructed so as to facilitate the rapid selection of individual cards by hand.

Alphabetical Punching

A simple code enables alphabetical information (e.g., description of goods, names and addresses, etc.) to be recorded in cards in the form of punched holes.

Interpretation

This defines the automatic translation of selected data in a punched card into clear characters along the top of the card.

Gang Summary Punch

When it is desired to "hold" balances, sub-totals and totals for future accountancy operations, or to set up summaries of detailed information, recourse is had to a Summary Punch which is linked to and operates with a Tabulator. When the Tabulator has calculated and printed the balance or required total, the Summary Punch automatically creates a card for this. It identifies the Summary Card with the detail cards in the Tabulator by reproducing the account number, customer number, etc. A Gang Summary Punch can also be employed independently for the punching of "common" information from one Master Card into any number of blank cards.

MR. PLUM, shall we call him, has a nice little family grocery business in a busy market town in the Midlands. He is already looking forward to the day when his smart shop front will carry the sign, "Plum & Son," when his own delivery vans will tour the countryside, and he will be able to purchase the premises next door to install that self-service equipment illustrated in the catalogues he collected at the last Grocers' Exhibition.

There are upwards of 120,000 Mr. Plums scattered around the English countryside, not all perhaps as energetic and industrious as he is, but all wrestling, practically unaided, with the same sorts of problems. To add to the worry of the rationing system—the common lot of all—there is, for so many of these food distributors, whose rôle is a vital one in the economy of the country, the spectre of sickness. "What happens," Mr. Plum asks himself, "if I'm ill?"

Mrs. Plum, you must know, has many fine qualities, but she is not good at figures. She is nervous and liable to get flustered, and her memory of prices is, shall we say, unreliable? Small wonder that she is uncertain. She serves in the shop only occasionally "to help out," and it is unreasonable to expect her to be familiar with the selling prices of all those hundreds of different lines continually in demand, when the amounts to be charged change with such bewildering frequency.

The particular Mr. Plum we have in mind is, however, a customer of The Ceylon Tea Company Ltd., and such is the service he receives from his wholesaler that Mrs. Plum's queries are easily answered either by simply turning up the last invoice, or by referring to the handy price list record for slow-moving items her husband has made from the same source. In this way she will find conveniently set out the controlled or suggested selling price for each separate commodity received in each weekly wholesale consignment, and for good measure and to facilitate easy reference,

the items in the invoice are arranged in a standard pattern according to the class of goods supplied.

A specimen of this invoice is shown on page twenty-three. It will be seen that it has other distinctive features which commend themselves to discerning traders appreciative of the assistance it gives them in the efficient conduct of their businesses.

Alongside the suggested retail (or controlled) price for each item the invoice shows the amount of gross profit obtainable on this selling price and the approximate percentage of profit due. This affords an invaluable and readily ascertainable comparison between the profit margins of competitive lines, assists in gauging profits, and points the way for the energetic and resourceful shopkeeper to increase his turnover in directions which will provide him with maximum benefit. Having regard always, of course, to the alternative quick-selling commodities, on which the profit margin is commensurately lower.

It will be seen also that the invoice is a continuous up-to-date statement of the customer's account showing "Balance from last account", "Cash received to date", and the new total "Balance due", or "Credit Balance", as the case may be. The advantage to the small shopkeeper is obvious. He knows from day to day the exact situation of his account and can adjust his purchases of new stock accordingly.

The system, which has been founded on the enterprise and initiative of Mr. Philip Brown, Managing Director of The Ceylon Tea Company, Wholesale Distributors, to whom we are indebted for permission to publish this article, continues to earn expressions of appreciation from the Company's 2,000 customers situated in an area covering five counties. The commendation reproduced opposite, from the Committee of the Derby Branch of the National Federation of Shopkeepers, is evidence of the value which is placed



A view of the master pre-punched commodity card files. In the centre is a revolving file holding cards for all normal quantities of rationed goods.

on this service by those who are best qualified to judge its merits.

The basis of the system is a Punched Card Master Pulling File. In other words, it is a file consisting of punched and interpreted Hollerith cards representing all commodities sold in all normal quantities. These cards—a specimen is illustrated below—are "pulled" against each item in each order received and are afterwards returned to the file for use again as required. It is, therefore, a "non-expendable" file. The cards are assembled for convenience in three collations: (a) General goods (b) Rationed goods and (c) Sweets. (Master Pricing Cards for rationed goods are separately assembled because of the more elaborate breakdown of quantities required, and "Sweets" are separated because they are subject to the "points" rationing system.)

Specimen pre-punched and interpreted master commodity card which should be compared with the first line of the Hollerith invoice shown on page twenty-three.

237S										56 LB GRAN SUGAR PKT																			
UNIT	COMM. NO.	QTY.	UNIT O. QT.	DESCRIPTION	POINTS	RATE	SUGGESTED RETAIL PRICE	CUST GROSS PROFIT	PROF. RATIO	VALUE	PURCHASE TAX	OUR COST PRICE																	
0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
2																													
3																													
4																													
5																													
6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	
7																													
8																													
9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	

COMMODITY CARD

"HOLLERITH" 4-1073-01 THE BRITISH TABULATING MACHINE CO. LTD., 17, PARK LANE LONDON W.1. PRINTED IN ENGLAND PC37

Illustrated alongside is the old form of invoice now replaced by the Tabulator produced invoice on the opposite page. In the place of this meagre handwritten detail the customer is now provided with the valuable additional information comprised in the new invoice.

PAST

PHONE: 44002
CEYLON TEA CO. LTD.
 15 & 17 LONDON ROAD, DERBY

Mr. J. Smith
 127. 12 Town Rd, Derby

QTY	DESCRIPTION	UNIT	PRICE	TOTAL
1 1/2	Kelepa 60/4	lb	17 4	
1 1/2	Kelepa 21/2	lb	11 2	
1 1/2	Kelepa 21/1	lb	11 2	
1 1/2	Kelepa 16/9	lb	16 2	
1 1/2	Kelepa 14/2	lb	14 2	
1 1/2	Kelepa 5/8	lb	5 8	
1 1/2	Kelepa 10/6	lb	10 6	
1 1/2	Kelepa 10/4	lb	10 4	
1 1/2	Kelepa 3/3	lb	3 3	
1 1/2	Kelepa 5 1/2	lb	5 1/2	
1 1/2	Kelepa 6 1/2	lb	6 1/2	
1 1/2	Kelepa 12	lb	12	
TOTAL			10 17 4	

THIS INVOICE IS TO BE FORWARDED FROM PREVIOUS INVOICE

ACCOUNT TO DATE £ 15 19 1

1655-28

E.O.E. Your account stated to date. If error is found, return at once.

These cards contain all the information required to comprise each invoice item entry.

Two other types of cards are also used: (a) Customers' Name and Address Cards—a permanent file used to enable the Tabulator to address the invoices (an illustration of these cards is shown on page twenty-four); and (b) Customers' Balance Cards (see below)—replaced when each succeeding new balance is recorded. These cards are filed together, the Customer's Balance Card behind its relating Name and Address Cards. The last-named are colour-stripped cards: the distinguishing use of different colours for these cards is for a purpose which will be explained later. The cards contain alphabetically punched names and addresses achieved by the use of a special alphabetical code, together with Customer Number and the initials of the traveller responsible for the named customer's account.

The Current Balance Cards, renewed as required by debit and credit changes, also contain the Customer Number and it should be noted that this number is repeated in the invoice, ensuring that the correct relationship between Customer identification and Balance Brought Forward is conclusively established.

With the above explanation it is now possible to follow the procedure from the receipt of the order to

the delivery of the goods. The firm employs on a salary and commission basis some twenty travellers and its representatives return late each afternoon with orders, cash receipts and details of other credits.

In advance of the orders to be received and assembled rationed goods allocations slips are made out in the office. (See illustration on page twenty-five.) These, subject to any modifications notified by the travellers, are attached to the travellers' general goods order forms. An illustration of this order form is also provided, and it should be explained that the manner in which the forms are laid out is related to the

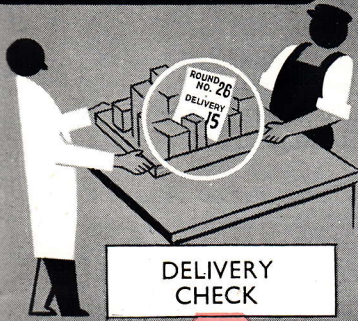
Customer's balance card containing the detail appearing in the last full line of the invoice opposite. To the right of this card provision is made for Mark Sensing and it is intended later to use this facility for recording cash receipts.

C.O.C.	CUSTOMER NO.	DATE			CASH RECEIVED	BAL. DESIN	BALANCE FROM LAST ACCOUNT	MARK SENSING		
		DAY	MONTH	YEAR				£	S	D
0	00000	0	0	0	0	0	0	0	0	0
1	11111	1	1	1	1	1	1	1	1	1
2	22222	2	2	2	2	2	2	2	2	2
3	33333	3	3	3	3	3	3	3	3	3
4	44444	4	4	4	4	4	4	4	4	4
5	55555	5	5	5	5	5	5	5	5	5
6	66666	6	6	6	6	6	6	6	6	6
7	77777	7	7	7	7	7	7	7	7	7
8	88888	8	8	8	8	8	8	8	8	8
9	99999	9	9	9	9	9	9	9	9	9

THE BRITISH TABULATING MACHINE CO. LTD., 17, PARK LANE LONDON W.1

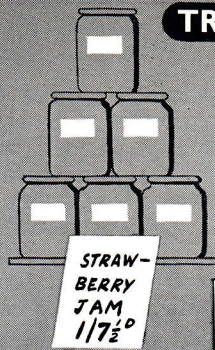
PRINTED IN ENGLAND P.C.41

GOODS DELIVERY



DELIVERY CHECK

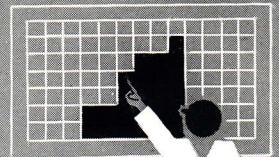
TRADING



SUGGESTED RETAIL PRICE



GROSS PROFIT



PROFIT PERCENTAGE

CEYLON TEA CO. LTD.

DIRECTORS: P. BROWN, H. BROWN
WHOLESALE TEA, GROCERY
AND PROVISION MERCHANTS

15 & 17 LONDON ROAD, DERBY

TELEPHONE 44002

MR A G SMITH
101 HIGH STREET
BURTON ON TRENT

E B

ROUND NO.	DELIVERY
26	15

CUST NO. 369

QUANTITY	DESCRIPTION	RATE S. D.	SUGGESTED RETAIL PRICE S. D.	YOUR GROSS PROFIT S. D.	APPROX. %PROFIT	EXTENSION
5 G LB	GRAN SUGAR PKT	5 0. 0	* 6	3. 0	10	1. 5. 0
7 LB	SLICED MIDDLE	3. 2	* 3 5	1. 9	7	1. 2. 2
2 LB	COOKING FAT D	1 3 0. 9	* 1 4	4	12	2. 4
6 TIN	BEANS TOM A I	8. 4	10	10	16	4. 2
12 TIN	N TOMATO SP L	1 0. 10	1 1	2. 2	16	10. 10
4 8 TIN	M TOMATO SOUP	1 3. 4	1 4	10. 8	16	2. 13. 4
12 TIN	RED PLUMS MED	1 3. 4	1 4	2. 8	16	13. 4
12 TIN	M MEAT SOUP	1 3. 4	1 4	2. 8	16	13. 4
6 JAR	GOODWIN STRAW	1 6. 3	1 7 1/2	1. 7 1/2	16	8. 1 1/2
3 6 1 LB	NATIONAL FLOUR	6. 3	* 4 1/2	1. 0	8	12. 6
24 PKT	STIL YORKSHIRE	4. 4	5 1/2	2. 4	21	8. 8
12 TIN	CB BROWN LGE	6. 0	8	2. 0	25	6. 0
3 6 DOZ	MATCHES	1. 9	2 0	9. 0	12	3. 3. 0
12 BOT	DADDIES SAUCE	9. 3	11 1/2	2. 3	19	9. 3
24 PKT	BISTO 40Z	6. 0	7 1/2	3. 0	20	12. 0
12 PKT	PRIMULA LGE	1 2. 6	1 3	2. 6	16	12. 6

DATE

0 3 6 9 2 3 JUN 5 2

CASH RECEIVED TO-DAY

1 5 6. 8 1/2

BALANCE FROM LAST ACCOUNT

22 4. 10

INVOICE TOTAL

1 3. 16. 6 1/2 *

BROUGHT FORWARD

6. 18. 1 1/2 *

E. & O.E. IF ERROR IS FOUND RETURN AT ONCE

CUSTOMER SERVICE

YOUR GROSS PROFIT AND PERCENTAGE PROFIT ARE COMPUTED ON THE SUGGESTED RETAIL PRICE. IT IS STRESSED THAT THIS IS ONLY A SUGGESTION EXCEPT WHERE THE CONTROLLED PRICE IS INDICATED THIS *

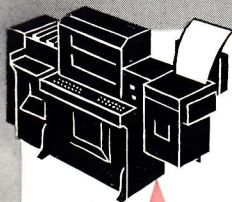
* = CONTROLLED PRICE

YOUR ACCOUNT STATED TO DATE:- £ 20. 14. 8 *

20. 14. 8 *

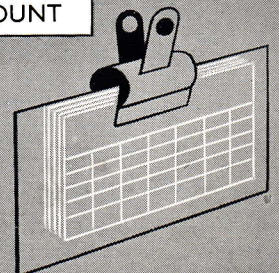
PAYMENT DUE

CURRENT STATE OF ACCOUNT



PRESENT

Above is the new and improved form of invoice which is produced more accurately and far more quickly than the old type illustrated on the preceding page.



ACCOUNTING

m A. G. Smith	
101. High Street.	
Burton-on-Trent.	
Customers No. 369	23.6. 1952.
56 lb. Sugar	
7 lb. Bacon	
2 lb. Cooking Fat.	

Rationed goods allocation form prepared before the receipt of the customer's order.

duces two documents in one operation. The combined functions of the top and carbon copies are summarised below :

TOP COPY

Goods Assembly Docket for warehouse use showing: Customer's Name and Number, and Descriptions and Quantities of goods for delivery.

Loading Docket for loading bays showing: Round Number and Delivery Number so that consignments can be quickly allocated to the correct vans and loaded in the most convenient order.

and
Customer's Delivery Note, Invoice, Statement and Price List, as shown in detail in the illustration on page twenty-three.

CARBON COPY

Accountancy record for filing as Sales Ledger sheet.

At the same time, by means of the Gang Summary Punch, a new opening Balance Card is automatically created for each account.

Area Analyses and Commission Accounts

When this documentation is completed the cards are passed through a Hollerith Sorter for the extraction of the Old Balance Cards which are accumulated for subsequent sales and travellers' sales analyses. Name and Address Cards are separated manually from the Commodity Quantity/Pricing Cards and associated with the newly created Balance Cards before being filed away for future use.

As the Name and Address Cards are extracted the Commodity Cards—representing sales invoiced—are segregated for each traveller. It is in connection with this operation that the colour striping of the Name and Address Cards becomes effective, because the

NAME AND ADDRESS A. G. Smith 101 High St. Cust. No. 369 Burton-on-Trent.	TOILET REQS., PAT. MEDS., DISINFECTANTS
CANNED GOODS 6 Ins Beans Tom Lt. 12 Ins N. Tomato Sp L 48 Ins Mashed Pot. Tom. Sp. 12 Ins Red Plum. Msd. 12 Ins Mashed Meat Sp.	POLISHES, BOOT AND SHOE 12 Tins C.B. Brown Lge.
PRESERVES 6 Jars Godwin Strawberry	SOAPS, POWDERS, STARCH, BLUES
CEREALS, PKT. SOUPS, PEAS, BLANCMANGE, MUSTARD POWDER 36 - 1lb National Flour 24 Pkts Fire Yorkshire	CANDLES, MATCHES, DOG AND CAT FOODS 36 doz matches
	BEVERAGES, FRUIT JUICES, COFFEE, OXO
	PICKLES, VINEGAR, PEPPER, MUSTARD, ETC. 12 Bot. Daddio Sauce
	SUNDRIES, G SALT, SALT, BOX CHEESE, BISCUITS, ANY OTHER ITEMS 24 Pkts Bisto 4oz. 12 Pkts Primula Lge

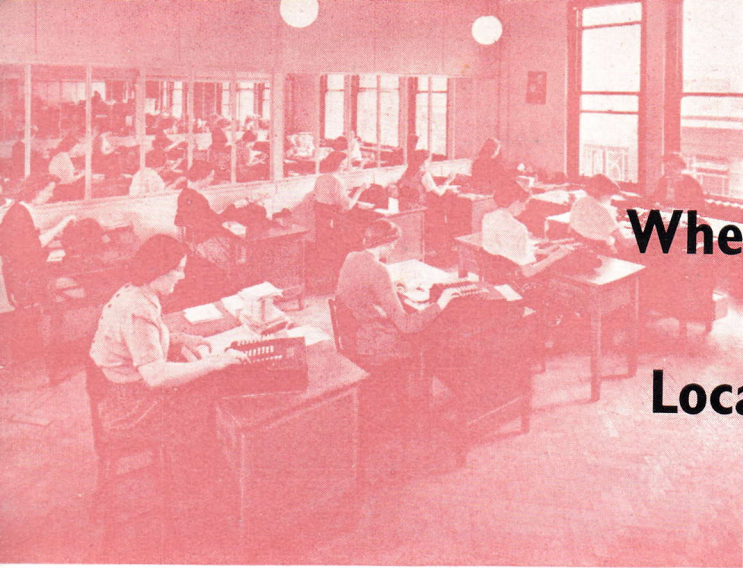
Order form. The goods ordered are divided under commodity headings which conform to the arrangement of the Master Commodity card file to facilitate the pulling of cards for each item enumerated.

different colours and marking of their top-edges serve to identify the travellers concerned. Each separate traveller's quota of cards is then tabulated to furnish area sales analyses and to obtain details for the compilation of the travellers' commission accounts. These cards are afterwards sorted to commodity order and again tabulated to furnish a gross sales analysis by commodities.

The Master Quantity/Pricing Commodity Cards have now momentarily served their purpose and are re-filed in the Pulling Files for use the following day.

The above must be regarded as a simplified explanation of the Hollerith punched card procedure adopted by this enterprising firm. It has been simplified only in the sense that some ancillary operations of tabulating for control purposes, to ensure agreement between opening balances, purchases, cash receipts and credits and closing balances, etc., have been omitted. These operations, which are part of the normal routine checking procedure integrated with Hollerith electrical sensing punched card technique, have been omitted in order to present more clearly the basic outline of the system and to show its day-to-day application.

There are few members of the community more deserving of assistance in these difficult times than the small retail shopkeeper, and we are gratified to be associated with The Ceylon Tea Company of Derby in contributing to his aid.



Where 7,000,000 Cards a year are used to assist Local Authorities' Accounting



Inaugurated by Mr. A. E. MARSTON in 1932, this is a service specialising in the provision of punched card statistical and accounting facilities for Local Authorities. The Head Office is in Cooper's Building, 12, Church Street, Liverpool. A Branch Office for the Southern Area is situated at Wenlock House, 41/43, North Street, Brighton.

THE SERVICE OPERATES either from the basic documents to the finished tabulations, or from cards already punched and verified to the required listed and/or tabulated results. In other words, documents are sent to one of the offices mentioned above, where the relevant data is extracted from them and transferred to punched cards, or the contractor himself undertakes the preliminary punching and verifying, and supplies the cards, together with a specification of his requirements in the way of Tabulator and ancillary machine production. In both cases control figures are established and agreed beforehand, and all subsequent punched card operations are "tied back" to these controls.

The work usually undertaken covers costing, general accounting and statistics. The method of presentation of the figures and the lay-out of the finished tabulations are arranged to suit the particular needs of the Authority concerned. Experience has shown that very little uniformity exists between these demands, so that in this organisation the resources of punched card machines are fully exploited. This is an example pointing to the value of the Hollerith Tabulator flexible Control Panel for the rapid changeover from one form of tabulation to another.

(Above) A view of the punch room in this busy Service Bureau, and (below) the commodious and well-appointed Hollerith machine installation.



When both current and accumulating reports over a period are required, the bureau maintains past records in summary cards from which the accumulative returns can be provided, and thus it caters not only for the single *ad hoc* demand, but also for the long-term commitment and periodical summary.

The installation consists of eight Senior Rolling Total Tabulators alphabetic and numeric, with ancillary equipment, and a staff of seventy-five operators, including clerical assistants, is employed.



Typical Hollerith punched card machine accounting jobs undertaken by this Bureau include:—

Weekly

DETAIL JOB COSTS—ENGINEERS' AND SURVEYORS' COSTS. (Combining all expenditure: Wages, Wages Oncost, Stores, Stores Oncost, Haulage, Direct Charges, etc.)

DETAIL ACCOUNT CODE SCHEDULES.

COMMODITY SCHEDULES. (For Stores Ledger posting.)

Monthly

JOB COST SUMMARIES.

ACCOUNT CODE SUMMARIES. (For Financial Ledger posting.)

MONTHLY AND CUMULATIVE COMMITMENTS (UNEXECUTED ORDERS PLUS PAYMENTS), AGAINST ESTIMATES.

INCOME FROM USE OF PLANT AND VEHICLES.

ANALYSIS OF INVOICES.

STORES LEDGER BALANCES.

CUMULATIVE SCHEDULES — JOB COSTS — ACCOUNT CODES. SUPERANNUATION QUINQUENNIAL VALUATION—ACTUARIAL STATISTICS. ETC. ETC.

HOLLERITH MAKES NEWS

Mechanical Handling

A feature of unusual interest at the *Mechanical Handling Exhibition* recently held in London was the working model of Hollerith punched-card-actuated conveyor mechanism shown by Messrs. George W. King Limited. A type 700 Hollerith Tabulator was in operation demonstrating the method by which assembly of manufactured components can be made selectively at will through the electrical impulses initiated by the sensing of the punched holes in Hollerith cards. The model consisted of miniature motor-cars suspended in carrying frames from an overhead monorail leading from separate bays in a sequencing area to a main assembly line. Selection of the vehicles, governed by the order in which the punched cards are presented to the Tabulator, attracted considerable attention. Visitors to this important Exhibition were able to see how the order and timing of automatic deliveries of components for final assembly can be effected by the employment of this new technique, which synchronises feeder conveyors with a main production line as a means for achieving maximum efficiency in the modern factory. The system is in operation at the works of the Austin Motor Company Ltd. at Longbridge, Birmingham.

Hollerith Plays the ACE

The National Physical Laboratory's Automatic Computing Engine is the subject of an interesting and informative article appearing in *Scope*. "Industrialists and scientists are frequently presented," the writer explains, "with intricate and lengthy arithmetical problems. Sometimes these involve so many computations that, even if desk calculators are used, it is almost—if not quite—impracticable to undertake the work. . . . Even when the task is finished, there remains the problem of ensuring that the calculations have been correctly done."

The main responsibilities of the Mathematics Division of the National Physical Laboratory are (1) To undertake research into new computing methods and machines. (2) To encourage the development of new computing methods and instruments, and the dissemination of knowledge regarding new and existing methods. (3) To advise on the need for new mathematical tables, and if necessary to prepare them. (4) To provide computing services for Government Departments, industry and the universities. (5) To act as consultants on mathematical techniques. The Division is equipped with a large installation of Hollerith machines, a differential analyser and an electronic calculator.

The article explains that the pilot model of the A.C.E. was designed and constructed in the laboratory and the

A.C.E. proper will be built later. The pilot itself is capable, however, of solving any arithmetical calculation.

Planning work for these electronic calculators takes considerable time, for the mechanism controlling their sequence of operation is far more complicated than the calculating mechanism itself. The machine receives its instructions from the sensing of punched holes in Hollerith cards and these packs of cards then constitute "programmes" for what are afterwards "standard" calculations. Once the instructional programme has been set up by this means it can be used over and over again whenever new problems calling for the same treatment are received. Lens calculations and the determination of wing loading and flutter characteristics of aircraft are among the many calculations the Automatic Computing Engine is able to perform in the merest fraction of the time needed by older and laborious methods.

Listener Research

Spotlight on the B.B.C. is the title of a film made by Rayant Pictures Ltd., and distributed by Twentieth Century-Fox Films Ltd. The inventive genius of the modern age is so lavish that we are fast losing our capacity to be astonished as one scientific "marvel" succeeds another. Radio is certainly old enough to be taken for granted, but this vivid and impressive film is a reminder that behind the service of the B.B.C. there is a vast organisation dedicated to the ideal of better and better broadcasting. Hollerith plays its part in the Department of Listener Research, which is featured in the film's opening sequence, and assists to establish the trends and changes in public taste for the guidance of those who arrange B.B.C. programmes.

Art in Industry

The Photographic Journal, official organ of the Royal Photographic Society of Great Britain, contains a paper read by Mr. Kenneth R. Cole, A.I.B.P. (Associate), entitled, "My Work in Industry with a Rolleiflex." This was presented at a meeting of the Miniature Camera and Pictorial Groups of the Society.

Mr. Cole is responsible for many of the outstanding photographs of Hollerith machines—both during their production and after final assembly—and examples of his work are well known to our readers. Specimens of photographs taken in our factories were used to illustrate his theme, which dealt with the problems of industrial photography and defined the approach to it: one which seeks to satisfy both the manufacturer's technical requirements and the artistic conscience of the professional photographer.

Fiction . . . and Fact

" . . . I was special, see. There were half a million other sergeants in the army who might have been chosen, but they had to find me for the job, and do you know how they did it?"

He drew them closer to him, pouring out the essence of his belief into their uneasy ears. "You've never heard of a Hollerith, have you? It was a thing they had in the army. I can't explain it to you, but it was a great room-sized machine, like a glorified cash-register, I've heard. They decided on the things they wanted in a chap—athletic, combat-trained, been in a few scrapes, reckless, able to climb and if necessary carry someone who couldn't, age twenty-six, not particular, not known to have a family or a woman, good with men, or anything else they thought of right down to the colour of his eyes. Then they pressed all the buttons and up came his card with his name and number on it. If there were two or three chaps there were two or three cards. Sound like magic to you, Corporal?"

(From "The Tiger in the Smoke" by Margery Allingham, published by Chatto and Windus.)



An artist's impression of MR. A. Y. KAMAT, an Indian visitor to Moor Hall who recently attended an Executives' Course at the Company's Educational Establishment at Cookham. Mr. Kamat was persuaded to sit for this portrait when he was visiting one of the many places of interest in the neighbourhood.

THE BRITISH TABULATING MACHINE CO. LTD.

HEAD OFFICE: 17 PARK LANE, LONDON, W.1

Telephone: REGENT 8155

SOUTHERN REGIONAL OFFICE:

Victoria House, Southampton Row, London, W.C.1. (*Holborn* 7866)

NORTH LONDON, SOUTH LONDON, READING AND CAMBRIDGE DISTRICTS:
Victoria House, Southampton Row, London, W.C.1. (*Holborn* 7866)

SOUTHAMPTON DISTRICT:

7 Cumberland Place, Southampton. (4659)

MIDLAND REGIONAL OFFICE:

King Edward House, New Street, Birmingham, 2. (*Mid.* 1812)

BIRMINGHAM DISTRICT:

King Edward House, New Street, Birmingham, 2. (*Mid.* 1812)

WOLVERHAMPTON DISTRICT:

Unravel House, 340 Newhampton Road East, Wolverhampton. (25592)

NOTTINGHAM DISTRICT:

Westminster Buildings, Theatre Square, Nottingham. (46421/2)

COVENTRY DISTRICT:

Hollerith House, 28-34 Whitefriars Street, Coventry. (61435)

BRISTOL DISTRICT:

Warriner's Building, Warriner's Wharf, Bathurst Basin, Bristol, 1. (26395/6)

NORTHERN REGIONAL OFFICE:

Century House, St. Peter's Square, Manchester, 2. (*Cent.* 3526)

MANCHESTER DISTRICT:

Century House, St. Peter's Square, Manchester, 2. (*Cent.* 3524/5)

LIVERPOOL DISTRICT:

A46 Derby House, Chapel Street, Liverpool, 2. (*Cent.* 5561)

LEEDS DISTRICT:

36 Albion Street, Leeds, 1. (32381)

SHEFFIELD DISTRICT:

Leopold Chambers, 5 Leopold Street, Sheffield. (20305/6)

SCOTTISH REGIONAL OFFICE:

166 Buchanan Street, Glasgow, C.1. (*Douglas* 9349)

GLASGOW DISTRICT:

38 Bath Street, Glasgow, C.2. (*Douglas* 8316)

EDINBURGH DISTRICT:

6 Rutland Square, Edinburgh, 1. (*Caledonian* 2853)

NEWCASTLE-UPON-TYNE DISTRICT:

157 Elswick Road, Newcastle-upon-Tyne. (34281)

GOVERNMENT SECTION:

Victoria House, Southampton Row, London, W.C.1. (*Holborn* 7866)

AGENTS FOR NORTHERN IRELAND:

CALCULATING AND STATISTICAL SERVICE:

7 Bedford Street, Belfast. (24635)

ALSO SERVICE REPRESENTATIVES IN:

Bournemouth, Cardiff, Carlisle, Chilwell, Darlington, Derby, Doncaster, Edinburgh, Gloucester, Handforth, Hartlebury, Hayes (Middlesex), Heywood, Hull, Kingston-on-Thames, Leicester, Lincoln, Milton (Berks), Norton-on-Tees, Norwich, Oxford, Peterborough, Plymouth, Porth, Quedgeley (Glos), Shotton (Chester), Stafford, Stoke-on-Trent, Thames Ditton, Warrington.

SPECIAL SERVICES:

CODING & REFERENCING CONSULTANCY SERVICES

142 Park Lane, London, W.1. (*Grosvenor* 7151)

HOLLERITH COMPUTING SERVICE:

142 Park Lane, London, W.1. (*Grosvenor* 7151)

SERVICE BUREAUX:

London, Birmingham, Manchester, Glasgow, Leeds, Liverpool, Newcastle-upon-Tyne, Molesey and Southampton.

TRAINING SERVICE:

EDUCATIONAL CENTRE: Moor Hall, Cookham, Berks.

WORKS:

Letchworth Garden City, Hertfordshire.

Alderley Edge, Cheshire.

Castlereagh, near Belfast.

HOLLERITH

(REGD.)

OVERSEA BRANCHES

Karachi, Rangoon, Colombo, Alexandria, Cairo, Melbourne, Perth, Sydney and Wellington.

ALSO SERVICE REPRESENTATIVES IN

Chittagong, Lahore, Rawalpindi, Shahjahanpur, Kuwait, Accra, Hong Kong, Singapore, Adelaide, Brisbane, Canberra, Valetta, Mauritius and Port of Spain.

OVERSEA SERVICE BUREAUX

Karachi, Perth, Melbourne, Sydney, Alexandria and Cairo.

OVERSEA COMPANIES

INDIA: Hollerith (India) Limited, Bombay.

BRANCHES at New Delhi, Calcutta and Madras.

SERVICE REPRESENTATIVES in Ajmer, Asansol, Bangalore, Baroda, Digboi (Assam), Jamshedpur, Jubbulpore, Kanpur, Meerut, Poona, Secunderabad and Satara.

SERVICE BUREAUX in Bombay, Calcutta, Delhi and Madras.

SOUTH AFRICA: Hollerith Machines (South Africa) (Proprietary) Ltd., Johannesburg.

BRANCHES at Cape Town, Durban, Port Elizabeth, Pretoria, Salisbury and Nairobi.

SERVICE REPRESENTATIVES in Bloemfontein, Bulawayo, East London, Kimberley, Luanshya, Mufulira, Vereeniging and Dar-Es-Salaam.

SERVICE BUREAUX in Johannesburg, Cape Town, Durban, Port Elizabeth, Pretoria, Salisbury and Nairobi.

OVERSEA AGENTS

EIRE: Calculating & Statistical Service, Hollerith House, 15 Harcourt Street, Dublin.

BURMA, CEYLON, HONG KONG: Hollerith (India) Limited, Liberty House, Marine Lines, Bombay, 1.

OVERSEA WORKS

Dublin, Eire
Bombay, India
Melbourne, Australia
Johannesburg, South Africa.

