Paper, Pen, Pencil, Sealing-wax, &c.; but in connexion with the separate industry of a commercial stationer there are a number of special operations and machines to which brief allusion may be made.

*Paper-Ruling.—*The ruling of blue and other coloured lines is usually done on a self-feeding machine provided with as many ruling pens as there are lines to be made, and these fixed in parallel order at intervals the width of the ruled spaces. The pens consist of grooved slips of sheet brass coming to a fine point, which in their upper part are covered by a sheet of felt saturated with a flowing ink, whence each pen obtains the supply required for tracing its line. The paper is carried forward by endless tapes or threads which pass around cylinders. In a recent form of machine the rulers consist of metal disks with thin edges, which take up printing ink from an india-rubber cylinder, and print the lines on the paper as it passes around a revolving cylinder.

*Paper-Folding* machinery is used for numerous purposes in the stationery trade, apart from its application to the folding of sheets for the bookbinder. Devices for folding come most prominently forward in connexion with the envelope manufacture, an industry which received an enormous development by the introduction of uniform postage rates. In envelope-making the folding is com­monly associated with gumming, and sometimes with embossing, in the same system of machinery. The first efficient automatic machine for envelope manufacture was devised by Edwin Hill and Warren de la Rue, and by them patented in 1845. Many forms of envelope folding and gumming machine now exist. In making envelopes the blanks are first cut out by shaped cutters or punches acting at one stroke on a thickness of from 200 to 300 sheets of paper. These blanks in the latest form of machine are gummed by a pad which takes gum from a roller and presses it on the edges of the paper, just as printing ink is received from cylinders and pressed on paper in printing. The gummed surface of the pad lifts each blank separately, places it under a plunger, which, descend­ing, passes it to folders, whence it is delivered into a clip in an endless band of considerable length. The envelopes are delivered into the clips in the band at the rate of about 100 to 150 per minute.

*Perforating* and *Punching* give rise to a range of machines of varied form and complexity. The idea of perforating paper so as to allow of the ready detaching of portions by tearing was conceived and. patented in 1848 by Mr Henry Archer. Of such utility was Mr Archer’s conception deemed by the post-office authorities as a con­venience for detaching stamps from sheets that in 1853 he was awarded £4000 for his patent rights. The applications of perfora­tion are now very numerous, but its value still remains most obvious in connexion with the detachment of adhesive stamps from sheets.

*Numbering* and *Paging* constitute another series of stationery operations, for which ingenious machines have been devised. For consecutive numbering a series of printing disks are employed, on the periphery of which the series of digits 1 to 0 are raised. The outer disk moves a number after each impression, the second disk moves once in ten times, and so on, thus automatically imprinting consecu­tive numbers up to the limit of the disks on the machine. Such a machine prints only on one side of the paper, and where the numbering is required on both sides the disks must be geared to move two places, numbering only odd or even numbers, two print­ings being thus required. For printing right and left consecutively an endless band machine is used, which prints alternately below and above for the two sides of the sheet.

STATISTICS. The word “statistic” is derived from the Latin *status,* which, in the so-called Middle Ages, had come to mean a “state” in the political sense. “Statis­tic,” therefore, originally denoted inquiries into the con­dition of a state. Since the beginning of the 18th century the denotation of the word has been extended so as to include subjects only indirectly connected with political organizations, while at the same time the scope of the investigations it implies has become more definite, and at the present day may be said, for practical purposes, to be fixed, though there are still controversies as to the position of statistical studies in relation to other departments of scientific procedure.

*History.—*The origin of what is now known as “ statistic” (Ger. *Die Statistik* ; Fr, *La Statistique;* Ital. *Statistica*)can only be referred to briefly here. As M. Maurice Block has observed in commencing his admirable treatise, “it is no exaggeration to say that statistic has existed ever since there were states.” For the first administra­tive act of the first regular Government was probably to number its fighting men, and its next to ascertain with

some degree of accuracy what amount of taxation could be levied on the remainder of the community. As human societies became more aud more highly organized, there can be no doubt that a very considerable body of official statistics must have come into existence, and been con­stantly used by statesmen, solely with a view to adminis­tration. The Romans, who may be described as the most business-like people of antiquity, were careful to obtain accurate information regarding the resources of the state, and they appear to have carried on the practice of taking the census, a very comprehensive statistical operation, with a regularity which has hardly been surpassed in modern times. As to the efficiency of the work done we have unfortunately very little information, but those who are curious on the subject may be referred to an article by Dr Hildebrand, entitled “Die amtliche Bevölkerungs­statistik im alten Rom,” printed in the *Jahrbuch für Nationalökonomie und Statistik,* 1866, p. 82.

Statistics, or rather the material for statistics, therefore existed at a very early period, but it was not until within the last three centuries that systematic use of the informa­tion available began to be made for purposes of investiga­tion and not of mere administration. According to M. Block, the earliest work in which facts previously known only to Government officials were published to the world was a volume compiled by Francesco Sansovino, entitled *Del Governo et Amministrazione di Diversi Regni et Repub- liche,* which was printed in Venice and bears the date 1583. Other works of a similar kind were published towards the end of the 16th century in Italy and France. Regarding these and other early books on the subject reference may be made to Fallati’s *Einleitung in die Wissenschaft der Statistik,* Dr G. B. Salvioni’s preface and notes to his translation into Italian of Dr Mayr’s work on statistics, and other authors mentioned at the close of this article.

Works on state administration and finance continued to be published during the first half of the 17th century, and the tendency to employ figures, which were hardly used at all by Sansovino, became more marked, especially in England, where the facts connected with “bills of mortality ” had begun to attract attention.

In the year 1660 Hermann Conring, “professor of medicine and politics,” a rather odd combination, in the university of Helmstädt, was in the habit of giving lectures in which he analysed and discussed the circum­stances existing in various countries, in so far as they affected the happiness of the inhabitants. Conring’s example was followed by other writers, in Germany and elsewhere, to whom reference is made by Block *(Traité,* pp. 5, 6) and Haushofer *(Lehr- und Handbuch,* p. 10, note).

The best-known member of the “descriptive” school was Achenwall (1719-1772), who is sometimes spoken of as “ the father of modern statistics,” but, as his procedure was essentially the same as that of Conring, though it was carried out more fully, the title has not been unanimously granted. It is generally admitted, however, that Achen- wall’s work gave a great impulse to the pursuit of the studies which are now included under the title of statis­tics. He called his book *Staatsverfassung* *der* *europäischen Reiche* in the first two editions (1749, 1752), meaning “Constitution of the States of Europe.” Subsequently he added “ vornehmsten ” and then “ heutigen before “ europäischen,” evidently with the desire of bringing his work, which may be regarded as the germ of such volumes as the *Statesman's Year-Book,* “up to date.’ Achenwall is usually credited with being the first writer who made use of the word “statistics,” which he applied to his collection of “noteworthy matters regarding the state”