PROGRESS OF PHOTOGRAPHY.

By CHAPMAN JONES.

TO most people fifty years ago, photography was represented by the "carte-de-visite" which they exchanged with their friends, and a few "views" which they bought now and then as mementoes. Some who were rather better-to-do preferred the larger "cabinets" which had been fashionable for two or three years. But there were also, as there had been for the previous thirty years or more, an increasing number of those who were really interested in the art and the science of photography. The Royal Photographic Society, then the Photographic Society of London, was sixteen years old, and there had been journals devoted to photography for about as long. The rapid rectilinear lens, which has enjoyed a greater popularity than any other lens, had just been introduced. The carbon process had already been practised commercially, but in that very year it received its final simplification by the elimination of the use of a cement to hold the exposed tissue on to its support during development. Large photographs had been made, one, 12 ft. by 7 ft., having been recorded in 1868. Photography in natural colours had had its history written, the principles of three-colour photography were understood, the nature of the developable image had been much discussed, and an electrical theory had been proposed. Actinometers had been devised. The kinematograph was represented by the zoetrope, or "wheel of life," a mere toy.

Thus it is obvious that when NATURE first saw the light photography had made very considerable progress, but its applications were hampered by its limitations. There was no plate sensitive enough for a photographic zoetrope, and the three-colour method of colour photography was not practical, because the plates available were insensitive to red and nearly insensitive to green. But the keys to the removal of these two great barriers to progress were soon to be found. Vogel's fundamental discovery that silver haloids might be made sensitive to red and to green by treating them with certain colouring matters was made within four years, and within eight years, during which gelatine had been coming to the front as a medium to replace collodion, Bennett found that by keeping gelatine emulsion warm for a few days the general sensitiveness of the plates coated with it was increased very many times. It remained, of course, to develop the possibilities thus demonstrated, and, equally of course, they were developed. During the 'seventies there were other notable matters. Printing in platinum was introduced, the replacement of glass by films received attention, and the photographic zoetrope became an accomplished fact in the work of Mr. Muybridge, of California.

In the 'eighties hand-cameras began to appear, isochromatic plates (that is, plates sensitised for green) were commercially produced, films were made practical, plates and films were coated by machines instead of by hand, and developing agents, which had hitherto been restricted to two or three, began to increase in number.

In the next decade, the 'nineties, Carl Zeiss issued the first anastigmat, which was soon followed by the products of other firms, and the mechanical, photographic, and optical difficulties of kinematography were largely overcome. Many new developing agents were introduced, and the chemical constitution apparently necessary to confer the power of development was elucidated.

In the early years of the present century much superior colour sensitisers for gelatine plates were found, and panchromatic plates became practically a new power in dealing with colour. The autochrome plate provided the first commercially practical method of photography in natural colours on a single plate and by one series of operations.

This brief sketch of some of the chief items of the history of photography for the period under review is necessarily very incomplete, but it gives landmarks that may help to picture the general progress. The applications to scientific and pictorial work, as well as to matters of immediate commercial importance, followed close upon each step that increased the scope of photographic methods, until in many cases these took the first place instead of a very subordinate position. We have examples of this in astronomy, in surveying, and especially in photo-engraving and block-making, for in this last case the hand methods have been rendered commercially obsolete. With the increase of facility the popularity of photography increased until now one regards any person who can say that he has never taken a photograph as something akin to a person who is unable to write.

The Editor asks me to say something as to the "promise of future advance." Photography in its essence is a pictorial method of recording, and may therefore be fitly associated with writing, though photography has the great advantage of being automatic. Besides this it has so many advantages that it will form a necessary part of the training of every well-educated person. Whether it will be a college or a secondary-school subject the educationists must decide, but it will form a necessary adjunct to the study of almost all college subjects. In the professional and commercial world its importance will be increasingly recognised as a means of rapidly getting unbiased records. The kinematograph is a photographic method of recording movement whether slow or rapid, and will therefore be increasingly appreciated both for scientific purposes and as a means of education.

As to pure photography—that is, the study of photography itself—we do not know what change takes place in silver salts when they are rendered developable. Of late this matter seems to have

passed into the domain of atomic or molecular physics. We know little enough about gelatine, and want to know a great deal more. Gelatine has proved to be a better medium than collodion, but there seems no reason to suppose that a better than gelatine may not be found. We seem to have realised the maximum aperture (or rapidity) in lenses, but there is no such absolute boundary to the sensitiveness of photographic plates, and here we look for continued progress. One fundamental question: Why should silver occupy such a unique position among all the elements with regard to the sensitiveness of its salts?

REPRODUCTION OF ILLUSTRATIONS, 1869-1919.

By EMERY WALKER.

FIFTY years ago illustrations for books or periodicals were printed either from engraved wood blocks, steel plates, or were lithographs. In the earliest numbers of NATURE examples may be seen of the first method—in that of January 20, 1870, we find a diagram of a section of the tube by which it was proposed to construct the Channel tunnel; and in that of February 17 an illustration of the Newall telescope at Gateshead: these could scarcely be bettered now. The map illustrating the main drainage of London, in the issue of March 31, is an example of the inadequacy of wood for such a purpose.

Two years later Mr. Alfred Dawson patented a method of engraving designed to supersede wood, and though his object was not attained in subjects requiring tone, diagrams and simple maps were found at once to be better and more cheaply engraved by his process.

Dawson's typographic etching, as he named it, is produced thus: A metal plate is coated with a ground of wax composition; the drawing is made upon the plate through the ground down to the surface of the plate with steel points, similar to those used in etching, but they are faceted to different dimensions at the points. If lettering is wanted, as for a map or a diagram, the letters are stamped in the wax with ordinary printer's type. The spaces between the lines and letters are then raised upon the plate by the addition of melted wax, which unites with the ground and runs up to the line, and in the hands of a skilful operator stops there, thus forming a mould. This is then blackleaded, and upon it copper is deposited by a galvanic battery. When the copper is about the thickness of fairly stout brown paper it is taken off the mould and the outer surface tinned and "backed up" with antimonial lead. The leaden surface is turned in a facing lathe and mounted upon wood or metal, which brings the printing surface of the block to the height of type. It is then practically a piece of type and can be "set up" and printed with the text of the page.

This process was a development, with some refinements, of a method patented by Edward Palmer about 1840, and called by him "glyphography"; it was used to a limited extent for book illustration.

Dawson's typographic etching is still in use, and it may be interesting to note that the line blocks for the maps in Fortescue's "History of the British Army," and the greater part of those for the last edition of the "Encyclopædia Britannica," were engraved in this way.

In France a method called, after its inventor, "Gillotage" had been in use a few years earlier than this, by which blocks for the cheaper kinds of newspapers were made by transferring to zinc drawings made in reverse upon lithographic transfer paper, and the "whites" bitten away with dilute nitric acid. This process was introduced into England after the suppression of the Commune in 1871. The application of photography to this process was the beginning of a revolution in book illustration. For though wood-engraving held its own for many years after this for subjects in which chiaroscuro was required, it was gradually disused for drawings made in line, and the art of pen-and-ink drawing for reproduction began.

Artists soon got used to the new method, and there was a general demand for a process which would reproduce not only drawings in line, but also those made in washes or body colour, and would be suitable for the direct reproduction in the printing press of a photograph from nature. This was met simultaneously by F. E. Ives, an American of great photographic distinction, and by a German inventor, Meisenbach. Ives's process, though beautiful results were obtained, was too complicated for general use, and Meisenbach's process, called in English "half-tone," held the field. The negative of the drawing to be reproduced was made by photographing through a screen of parallel lines placed close to, but not touching, the sensitive surface of the photographic plate, and when the exposure was half-completed the lens was covered and the screen turned round so that the lines ran in the opposite direction to that in which the screen was first placed, and the exposure completed.

This was in 1882. The result was rather crude and deficient in variety of tone. The real advance was made by the invention, by Max Levy, of Philadelphia, of a new screen composed of two ruled glasses placed in contact at right angles. Max Levy's screens were imported largely, and from this time England, which had been, in the earlier stages of the invention, dependent upon Vienna, and to a smaller extent upon Paris, for half-tone blocks, went ahead, and now half-tone work made here is not second to that of any country in the world. It is used, not only in books, but also for the illustration of daily papers.