in which the lenses, in accordance with A. Gullstrand’s rule, are so arranged that the centre of rotation of the eye always coincides with the nodal point of the lenses. If every one had the same inter- pupillary distance there would be nothing more perfect than this stereoscope.

If in fig. 6 the two pictures L and R are interchanged in both pictures (*a* or *b* in fig. 11), then the image-points for H are closer together than those for V ; thus in stereoscopic vision H appears in front of P, and V behind it. No change is made to the relief by turning the picture upside down (r and *d* in fig. 11). In fig. 11*d*,the pictures are in the same positions as when the photographs are taken (F1, F2 in fig. 6). Obviously transparent pictures can be easily reversed ; in other cases it must be effected by mirrors (Wheat­stone, Dove and others) or by an erecting reflection prism. The original unbroken plate (fig.1 1*d)* can be seen in the pseudo-stereoscope shown in fig. 12, and the correct relief is obtained if it is rotated about the connecting line of the two pictures before placing in the stereoscope. If a symmetrical body be observed in the pseudo-stereo­scope, for example a pyramid, the relief is still reversed. But if a prism be dispensed with the object appears flat, and a plane drawing appears in relief.

These pseudo-stereoscopic phenomena are of the greatest importance for the study of the principles of stereoscopy, for they demonstrate that the per­ception of depth can be aided by a direct presenta­tion and hindered by a reverse presentation. If a plate of the dolomites, for example, with a large base line, arranged as in 11*a* and 11*b* is taken, and the apparatus and the eyes are directed upwards, then the pseudomorphic image in space looks like the roof of a stalactite cave. On the other hand, when arranged as 11*c* and 11d the image appears correctly represented, but it is a little more difficult to see the horizon in the foreground of the pseudomorphic image. Reference can only be made here to the physiologically interesting phenomena of colour-tones, which are a result of the chromatism of the eye and occur in monocular and binocular vision (Dove and, more recently, A. Brückner).

A comparatively simple solution to the problem of putting pic­tures seen in a stereoscope in motion is provided in the *muto- scope* for a single observer. The other problem—to make one stereoscopic picture visible to several people simultaneously— can be met in various ways, most simply (according to Roll- mann [1853] and D’Almeida [1858]) by portraying the two stereoscopic pictures in different colours one over the other, and giving each observer spectacles of different coloured glass for each eye, with which it is only possible to see one picture with each eye. Another method suggested by I. Anderton (1891), in which polarization and a Nicol prism must be used to separate the pictures, has met with little success, and F. E. Ives's novel proposal (1903) to separate the pictures when being taken and also observed by a ruled grating placed immediately in front of the photographic plate is not practicable. A method devised by D’Almeida, which depended upon the alternate visibility of the two pictures, demands a mechanism for each observer, exactly synchronous with the intermittent illumina­tion. This principle was successfully adopted by J. Mackenzie Davidson and H. Boas (1900) for a direct stereoscopic observa­tion of Röntgen radiographs. Immediately after the discovery of the Röntgen rays in 1895, E. Mach made stereoscopic investigations of these radiographs.

The development of stereoscopy has in no way been uni­form; on the contrary, a long period, during which practi­cally no interest was taken in stereoscopy or stereoscopic phenomena, was preceded during the middle part of the 19th century by a period of universal interest. The reason for this was not so much the realization of the defects of the stereo­scopes in themselves, and the trivial manner in which they were put on the market, as, for example, a closing stereoscope con­taining confectionery, as the fact that the public did not know how to make use of the pictures seen in the stereoscope. This state of affairs was altered when Zeiss, of Jena, as a result of the investigations of E. Abbe and C. Pulfrich, succeeded in constructing apparatus which made it possible to measure the three-dimensional images.

The stereotelemeter, constructed after II. de Grousilliers’ idea, appeared in 1899. This is a double telescope with the distance between the objectives increased, and a number of rows of marks placed in the plane of the image which appear as real objects floating at fixed distances above the landscape, from which the distances of the objects in the view can be easily read. In 1905 Pulfrich devised a method of stereoscopic measurement which is specially interesting from a physiological point of view, but which can only be employed for isolated objects, such as beacons, signals, &c. This method has the peculiarity that no marks are necessary for the measurement. The binocular tele­scope is so arranged that it always produces two three-dimen­sional images of the object which is to be measured close to one another, which as a rule are seen as though they were at different distances and of different sizes. The measurement is made by causing the difference of relief of the two images to disappear either by bringing the instrument nearer to the object or by readjusting the apparatus. The equal size of the two three-dimensional images can be regarded as a criterion of their equal distances; and it is of further advantage to the method that the images to be compared are.equal as to definition and colour.

A consequence of these instru­ments, which are chiefly important for military surveying, was the Pulfrich stereocomparator devised in 1901. The stereoscopic measuring machine invented by H. G. Fourcade of Capetown (1902) is similar to this in many points. These instru­ments inaugurated the successful measurement of the distances of distant objects and the uses of stereoscopy were consequently increased. Measurement is not made of the objects themselves, but on photographic plates which are taken with special, instruments— field- and stand-phototheodolites—at the extremities of a base­line which is always selected according to the distance of the object and the exactitude of measurement needed. For measuring the pictures a binocular microscope, adjusted to the dimensions and the distance between the two plates, is used, and a fixed mark is placed in each image plane which combine in binocular view to a virtual mark in the three-dimensional image. If the plates are correctly