

tracks on two perpendicular planes. Measurement of the angles made by the initial straight portions of the projections with the direction of the X-ray pencil makes it possible to calculate the angle between the actual initial portion of the track and the plane containing the pencil and the electric vector (δ) and the angle between that portion and the direction of the X-rays (θ). Statistical examination of values of δ and θ might then be expected to show most probable values of these angles and the existence of lateral and longitudinal asymmetry. Further, it would be possible to determine the three co-ordinates of any point on a track and therefore the true path of the β -particle in its flight through space.

In practice, adopting the Wilson mercury-lamp flash method of illumination and directing the illuminating beam almost horizontally on the line of the X-ray pencil, it was found that whilst ample light was scattered forward, giving good records in the horizontal camera, so little was scattered at right angles, that is, vertically, that the tracks were not recorded on the negative in the vertical camera. This difficulty was overcome by placing in the appropriate position on the base of the cloud chamber a right-angled glass prism and producing total internal reflection of the illuminating beam in a direction bisecting the angle between the axes of the cameras. Photographs so obtained were of satisfactory and approximately equal density.

Measurements have been made by low-power microscopic observation of the negatives directly and the advantages anticipated by the substitution of right-angle for stereo-photography realised. Using heterogeneous X-rays and moist air in the chamber, the existence of both types of asymmetry has been found. Experiments are now in progress in which homogeneous X-rays produce tracks in gases other than air.

ORRELL DARBYSHIRE.

Physics Department, Armstrong College,
Newcastle-upon-Tyne, August 19.

Spatial and Time Relations in Dreams.

IN NATURE of August 7, Dr. J. H. Kenneth refers to my letter which appeared in the issue of March 17, 1923, and he describes further observations of hypnopompic images.

In my letter I referred to an observation at the high-speed extreme end of the scale of time, in which the speed was so high that the image consisted only of blurred fleeting parallel lines, seen in an almost unconscious state. Curiously enough, after more than a year without any observations worth mentioning, I was enabled this very morning to confirm my statement that "the speed of succession (I ought to have said, of translation) of the images is an inverse function of the degree of wakefulness," by an observation at the other extreme end of the scale, thereby completing the series of observations necessary to establish the relation between speed and consciousness on a sound scientific basis.

I had just been roused from a deep sleep (the whole of the previous night having been spent journeying in a railway carriage, and therefore practically sleepless), I had exchanged a few words on the weather with the person who had awakened me, and I was therefore *quite awake*; I had closed my eyes for a few minutes before getting up, when, to my surprise and delight, an image at an *absolute standstill* appeared suddenly. The image represented a grassy rising slope with outcropping rocks, the details being so clear that, had time permitted, I could have counted the rocks; it lasted some eight or ten seconds before vanishing, and during that

time it remained quite motionless. While observing its details I was fully realising that I was witnessing the process of unconscious mind-picture forming at the hitherto unobserved zero end of the scale, and verifying the relation I had expressed several years ago, and to which my attention had been again called by reading, last night, Dr. Kenneth's letter.

It is perhaps significant that, two days ago only, I was in North Wales and I had climbed the Moel Siabod (2860 ft.) alone, and therefore with my mind entirely free from diversions, and naturally concentrated on the orographic feature which had faced me during most of the time taken by the ascent, namely, up to the final steepest climb, a grassy slope from which emerged innumerable rocks.

I have used above the word 'mind-picture,' but it must be understood that such a hypnopompic image is quite different from a mind-image, as usually conceived, every detail of which is necessarily the result of an act of volition on the part of the person whose mind forms the image. A hypnopompic image appears as a whole, in all its intricacy of wonderful details, without any volition whatever. In the *Journal of the Society for Psychical Research* I have stated that the image seems capable of gradual modification at the result of volition, but on the whole my observations do not seem conclusive enough on this point, and it remains doubtful.

This study of hypnopompic images is not only very interesting, but it is also perhaps the only direct path of approach towards the elucidation of the *modus operandi* of the formation of an image by the mind and its perception as such, with all its minute details. Occasions in which such images come under reasoning observation are necessarily few and far between, and all students of psychology are greatly indebted to NATURE for keeping on record such scanty observations as are available, and which otherwise would be lost, or fail to fall under the notice, and awake the interest, of others.

The principal features of interest are, besides the speed relation referred to above, the possible simultaneous existence of several superposed 'films,' their variable inclination and the possibility of their snapping, referred to in my letter. Dr. Kenneth has established a most important feature, namely, the relationship between the inclination of the line of motion and the position of the observer, which I have so far failed to notice. I have forgotten the details of the observations described in my letter to which Dr. Kenneth refers, and I must therefore abide by my notes; these seem to imply the simultaneous existence of several films, superposed and at different inclinations, and this is at variance with Dr. Kenneth's observations. As the latter appear to be much more precise than mine, so far as this particular question is concerned, mine consisting but of one single instance, noted in passing, while my mind was concentrated on other details, I think that they should be given more weight, until my own observations are confirmed. Both states can possibly occur, according to circumstances.

M. E. J. GHEURY DE BRAY.

40 Westmount Road,
Eltham, S.E.9, August 22.

Pernicious Grafting.

THE question raised in a letter on this subject from Dr. Grabham in NATURE of July 17 is one of very real interest to horticulturists in Great Britain as well as to growers in Madeira. Examples of 'incompatibility' between stock and scion occur in practically all the commercial fruits which are propagated