

Telekinesis and Materialisation.

By Dr. E. E. FOURNIER D'ALBE.

THERE are certain classes of phenomena, both physical and biological, which for two generations have been persistently pressing for recognition by official science, and have been as persistently refused such recognition. With the present world-wide organisation of scientific research, such a situation is, to say the least, unusual. It is not as if new observations were habitually neglected. Quite the contrary. The announcement of a new discovery instantly sends a flutter through the universities and research laboratories, and within a week hundreds of competent men are eagerly testing, repeating, and criticising the alleged discovery. After a short period of doubt and perhaps controversy, the innovation is either confirmed or discredited, and the attitude of science towards it is settled.

This sifting process is particularly rapid in physical and chemical phenomena, where spurious discoveries are given short shrift. We need only recall the recent 'death-ray' scare to realise the rapidity and finality of the process.

When a biological or psychological factor is involved the decision is often delayed. It took nearly three years to demolish Blondlot's 'N-rays,' and even then the Académie des Sciences awarded him a prize of 20,000 francs for his (more or less futile) researches in a field of unusual difficulty.

In medicine the issue may be in doubt even longer, as in the case of Koch's tuberculin, though the rapid recognition of insulin as a cure for diabetes is an example to the contrary.

It would be difficult to find cases where facts and their interpretations have been in doubt for more than fifty years. Yet that has happened in the case of the alleged phenomena of 'telekinesis' and 'materialisation.' They belong to the class of phenomena formerly termed 'occult,' but as this term is too suggestive of the Middle Ages, more up-to-date names such as 'supra-normal,' 'hyper-physical,' or 'metapsychic' have been invented. Currently they are called 'mediumistic,' on account of their association with spiritualism.

The word 'telekinesis' was coined by Alexander Aksakow, the first man to attempt to erect occultism into a science. It denotes the movement of objects at a distance without normal means. 'Materialisation' means the formation of organic or inorganic structures from material borrowed from the body of the person in whose presence the phenomena take place, and who is essential to their production. This person is barbarously called the 'medium,' though the word 'psychic' is often preferred.

'Materialisation' was first heard of in 1870, when Mrs. Andrews, of Moravia, N.Y., produced 'spirit forms.' These were originally supposed to be efforts of disembodied spirits to take on ordinary substance for the purpose of making themselves visible to mortals. No importance was attached to these and similar phenomena by scientific men until

1871, when Prof. (later Sir William) Crookes announced his intention to make a series of test experiments. The experiments were spread over three years, and led to the most amazing results, which, if corroborated, would have revolutionised both physics and biology.

Unfortunately, they were conducted without those extensive precautions without which, as experience has shown, it is impossible to arrive at a clear-cut decision in these matters. Crookes himself seems to have felt that he was losing his way. He abruptly stopped his investigations, and for the rest of his life confined himself to an unprogressive attitude of general assent to the spiritualist position. But his action gave a tremendous impetus to occultism generally, and a succession of famous mediums did their best to reach the pinnacle of D. D. Home and Florence Cook. Eusapia Paladino in Italy, Marthe Béraud ('Eva C.') in France, Kathleen Goligher in Belfast, Willy Schneider in Austria, and 'Margery' (Mrs. Crandon) in America, are the only ones who have been subjected to scientific tests.

Of these, Eusapia stands out as the most remarkable personality. She was born at Minervino-Murge in the Abruzzi in 1854. Orphaned at an early age, she went into service at Naples, and soon got caught in the epidemic of table-turning which prevailed in the 'seventies. At twenty-two she was 'discovered' by the Florentine spiritualist Damiani, who had been strongly influenced by the work of Crookes. We accordingly find that Eusapia's chief 'control' thereafter was a spirit called 'John King,' who claimed to be a brother of 'Katie King,' the amiable spirit maiden whom Crookes had embraced at one of his most remarkable sésances. At thirty-two she had married a small shopkeeper, but soon she was lifted out of her lowly sphere by the generosity of Cavaliere Chiaia, who educated her and afterwards introduced her by open letter to Lombroso, the famous criminologist.

"Bound upon a chair," he said, "or held tightly by the hands of the curious, she attracts the furniture round her, raises it up, keeps it suspended in mid-air like Mahomet's coffin, and makes it descend in a wavy motion, as if obedient to a strange will. She increases or diminishes her weight at will. She raps and hammers on the walls, the ceiling, or the floor as requested. . . . When her arms are fastened, a third arm appears, nobody knows whence, and plays amusing pranks. It removes hats, watches, and money, rings and pins, and skilfully returns them. . . . A large, horny hand, which makes you feel cold down your back, may be grasped, pressed, and inspected, and finally rises and hangs in the air, as if severed at the wrist, resembling the wooden hands hung outside their shops as signs by glove-makers."

This introduction led to the complete conversion of Lombroso, who was eventually persuaded that

he had embraced the spirit of his dead mother, materialised through Eusapia's mediumship.

Eusapia soon became famous. She travelled all over Europe. But she was not always equally fortunate. The Society for Psychical Research found she had a trick of freeing one hand by joining the hands of the persons controlling her. But such exposures do little harm to established mediums.

Practically all the well-known mediums have been detected in fraud at one time or other. But for every such exposure there is a ready excuse. The medium is in a state of trance or semi-consciousness, and the controlling spirits are of all kinds, even tricksters. When Florence Cook was, in 1880, caught impersonating the spirit 'Mary'; in other words, when she was convicted of fraud, the explanation advanced was that it was a 'transfiguration.' The supernatural element is introduced at every stage. Even when not deliberately mentioned, it is made to influence the investigator in the form of a demand for 'sympathetic' conditions. In a word, the application of the scientific method is rendered impossible by making the success dependent upon the whim of a supernatural entity.

During the study of mediumistic phenomena for more than twenty years, I have met most of the famous mediums and have had occasion to defend some of them against what I believed to be hasty and ill-considered judgments. I had great hopes of Eva C. and Miss Goligher, thinking they would furnish the groundwork of a new science. But at every step the investigator is baffled by the 'unseen operators'—be they embodied or disembodied—who will not come to a clear-cut issue.

The reviewer in NATURE of Geley's "Clairvoyance and Materialisation" says, in the issue of Aug. 27, p. 296: "It seems to me the duty of science either to show that, in the nature of things, there is no inherent possibility for the existence of ectoplasmic matter, or to attempt a tentative explanation of the phenomena." I regard the former alternative as impracticable. Who can set a limit to the possibilities of the organic world? Every individual born is a new experiment, and none can say what strange beings may yet be produced, or with what wonderful faculties they may be endowed.

If we must have a tentative explanation, there is one ready to hand. *The alleged phenomena of telekinesis and ectoplasm are all spurious, and are due to faulty observations or faulty conditions.* How difficult the conditions of the average séance are can only be realised by practical experience. The illumination is of the order of 0.001 foot-candle, and is usually considerably over-stated. The observer is wearied by hours of strained attention without anything happening. Often the sitting is entirely barren, and before the next sitting he will naturally examine his conscience to see whether an undue insistence on evidential conditions may have inhibited the phenomena. So he relaxes them. Then he gets phenomena. But they are no longer evidential.

Out of the large array of mediums who have

shown the phenomena of 'teleplasm' or 'ectoplasm,' only three have been investigated under scientific conditions. Dr. Baron von Schrenck-Notzing spent several years in studying Eva C. He gives the following description of ectoplasm:

"The Ectoplasm on further condensation becomes white and transforms itself into amorphous coagulated masses or packets, or assumes the structure of the finest web-like filmy veils. Sometimes the veil-like forms are doubled over at the margin, so that the first impression is that of a stitched hem. THE VEILS NEVER SHOW THE CHARACTERISTIC SQUARE THREAD-WORK OF REAL VEILS. . . .

"The pieces look like torn shreds of fabrics, or like ribbons, strings, or long fibres, or again like low organisms. . . . The mass seems to pass freely through the lighter materials of the dress, penetrating them, perhaps in a vaporous form, and subsequently condensing in the form of grey flakes.

"The experiences with Eva C. show many correspondences with the phenomena of Eusapia Paladino. The symptoms of mediumistic labour and its muscular accompaniments were found in both persons. The same utterances of pain, the same moaning and pressing, the same effort of will."

On two occasions Dr. von Schrenck-Notzing was able to obtain samples of the substance, and subject it to analysis. The first sample was indistinguishable from human skin such as might be peeled off a human heel. The second sample closely resembled saliva in its microscopical character.

In March 1922, Eva C. was investigated by a committee appointed by the Psychological Institute of the Sorbonne. This committee reported that what phenomena there were could be produced by regurgitation. The same result had been arrived at by the London Society for Psychical Research in 1920.

The case of Kathleen Goligher resembled that of Eva C. in many particulars, but her phenomena were unaccompanied by the signs of physical distress exhibited by the other mediums. Dr. Crawford published numerous photographs, which strongly suggest the textile nature of the substance. This was established by me in 1921, when I succeeded in taking the only contact photographs of ectoplasm ever obtained. They were taken by putting the photographic plates on the floor under the table and requesting the 'operators' to place some ectoplasm upon them. When all was ready, a small electric lamp fixed on the under side of the table was switched on for a few seconds. The results showed the unmistakable structure of chiffon or a similar material.

Quite recently another case of materialisation, in connexion with 'Margery' (Mrs. Crandon), was investigated by Mr. E. J. Dingwall. He found the materialisations resembling animal tissue. "The appearance," he says, "suggests something analogous to lung tissue, and the smell of the substance which, according to Dr. Worcester, resembled the

smell of the entrails of a freshly killed animal, pointed in the same direction."

There is nothing in all this to make out a plausible case for the assumption of a new substance called 'teleplasm' or 'ectoplasm.' It is impossible to extract from the literature on the subject any consistent description of its supposed properties. In the days of Katie King, the apparition was able to cut off portions of her dress and distribute them to her audience, who found that they resembled ordinary calico. Nowadays the substance is supposed to be very fugitive and sensitive to light. The hypothesis which seems to cover all the facts is that a succession of mediums, under pressure from sitters anxious to see marvels, have produced these 'spirit forms' by trickery. This trickery has become increasingly difficult and has practically disappeared whenever test conditions are applied. It is, therefore, impossible to admit the existence of any new facts, and even a tentative explanation of them is uncalled-for. Science might just as well concern itself with the anatomy and physiology of fairies.

There is another matter which must not be overlooked. The forces behind occultism and supernaturalism are very powerful. They are based upon the very human craving for the mar-

vellous. All religions contain this element, and promote it in various ways. There is a tendency in modern times, especially in America, to link religion with science, so as to utilise the growing prestige of the latter. The funds available for the enterprise of winning the approval of science for the modern miracle are very considerable. A wealthy French spiritualist recently established and endowed an International Metapsychic Institute in Paris, and appointed as its director a local practitioner of spiritualistic sympathies, Dr. Gustave Geley. The publication of his conclusions and speculations in an imposing and expensive volume formed a very telling piece of propaganda.

Such institutions form a kind of spearhead forged by occultism for piercing the armour of science, and it would not be surprising to see the foundation in England of an Imperial Academy of Natural and Supernatural Science, generously endowed from British and American sources. Its prospectus would be liberally sprinkled with the names of Crookes, Lombroso, Richet, Flammarion, Geley, Crawford, and von Schrenck-Notzing, and everybody would know that science had at last become 'spiritualised' and centred in other worlds than ours; and sacerdotalism, having been expelled by the door, would come back through the window.

Base Exchange and the Formation of Coal.

By Dr. E. MCKENZIE TAYLOR.

DURING a soil survey of the northern portion of the Nile Delta for reclamation purposes, a deposit of vegetable debris was discovered at a depth of two metres below the soil surface. As this deposit was found to contain peat, fusain, and partially fusainised material, an association that does not appear to have been recorded previously, it appeared that an investigation of the conditions under which the deposit existed might afford evidence of the mode of formation of coal. It is accepted that coal has been formed from vegetable material, and it has been generally assumed that the vegetable material accumulated as peat. The connexion between peat and coal has, however, not been established.

An examination of the soil overlying the vegetable layer in Egypt showed that it was alkaline and that the principle replaceable base present was sodium. The soil had originally been formed by the deposition of Nile silt in which the main replaceable base is calcium. The conditions under which the soil was situated showed that the conversion of the calcium-clay in the Nile silt into sodium-clay had taken place as the result of base exchange with sodium chloride solutions, and that the alkalinity had been produced by the subsequent hydrolysis of the sodium-clay in fresh water. Investigations in the laboratory have shown that it is possible to maintain the alkalinity of a medium for a considerable length of time by the hydrolysis of sodium-clay. It has also been shown that a roof containing hydrolysing sodium-clay is impermeable to gases and water, that the conditions under such a roof are anaerobic, and that

the alkaline medium produced under such a roof is suitable for the continuous bacterial decomposition of organic matter.

A study has been made of the bacterial decomposition of organic materials under the alkaline anaerobic conditions furnished by a roof containing sodium-clay. Sugars, starch, and cellulose decomposed under these conditions yield gaseous products only, the gas produced accumulating beneath the roof. An examination of this gas showed that it was principally methane, the carbon dioxide produced during the decomposition having been absorbed by the sodium hydrate resulting from the hydrolysis of the sodium-clay. Mature leaves were submitted to bacterial decomposition under a sodium-clay roof. The residual solid product was black and possessed the typical fusain structure. Analyses of the leaves at intervals showed that elimination of oxygen was taking place and that the process of decomposition was continuous. The bacterial decomposition of peat under a roof containing sodium-clay was also investigated. It was found that peat could be decomposed under the alkaline anaerobic conditions, that the alkali-soluble 'humus' in the peat was removed in solution from the seat of the bacterial action, and that the gas accumulating under the alkaline roof was methane. The investigation of the bacterial decomposition of organic materials under a roof containing sodium-clay has shown that bacterial activity in the continuously alkaline medium is not inhibited by the accumulation of toxic products of the decomposition and that the solid residue is a reduction product. It has also