

degree of their strength and variety increases in proportion as the persons are more diseased, and subject to nervous complaints, spasms, and similar affections. This is so much the case in Miss Sturmann, for example, that sometimes she cannot take hold of a key or bolt of a door, without her fingers being seized with cramps ; while, at the same time, she nevertheless walks about the house, garden, or even in the streets, like a healthy person.

In the course of my numerous investigations on highly sensitive persons, I soon became aware that these antipathies had some points in common, that some agreement was to be found, the further tracing and comparison of which could not but afford hope of discovering some relation of cause and effect in the phenomena, and thus possibly supplying the means of penetrating the common, deeper-lying natural cause. I found that certain definite sensations always returned, and that when the feelings of the patients were clearly made out and distinguished by similar names, their apparent multiplicity might be traced back to a few which were continually recurring. And these few I soon found to obey settled rules. They consisted of feelings of apparent heat or cold received from various substances of exactly equal temperature ; of more or less decidedly pleasant or disagreeable character, increasing so far as to the production of convulsions, of sensations of pricking, throbbing, or drawing, affecting the skin and extremities, and of painless tonic spasms. In the second of these treatises, where I have explained the character of the force of crystals, I have already pointed out that in the case of Miss Nowotny, the last phenomena, the painless tonic spasms, were produced by the emanations of the poles of the axes of crystallized bodies, and that the capacity for producing this effect was imparted in different degrees of strength to different bodies, but was never wanting in those which are capable of forming free crystals, whether they consist of a simple or any ever so

greatly compound substance. This kind of sensation has, therefore, been to a certain extent discussed, and for the present settled : there only remain to be examined, therefore, the sensations of apparent *difference of temperature*, those of *unpleasantness*, and the seeming *mechanical agitations*, of the pricking, &c. : and we will here apply the test to some of them.

Some of these sensations extend to the healthy, but the highly sensitive experience them more strongly or weakly, according to the nature of the disease, and to the standard of exaltation of their sufferings. I was led to the first investigation in this direction by the recognition, in Miss Nowotny, that all amorphous bodies, which are devoid of the peculiar efficacy of crystallized, had nevertheless a reactionary influence of a disagreeable kind, as well as sometimes an additional one of heat or cold,—that this was attached, with a certain constancy, to particular substances, and possessed different degrees of strength in different substances ; while, in the former case, the crystallic force seemed to proceed from the kind of condition of aggregation : here something dynamical, of a different kind, showed itself in the matter itself : form and substance, therefore, exhibited a strongly marked difference in their power of affecting external things.

176. As it was evident that something lay hidden here, which must possess either physiological or physical interest, I undertook the no small labour of testing the sensation of discomfort of the patients, with more than 600 substances ; namely, the greater portion of my collection of chemical preparations. It was found that there were in these very clearly marked gradations, and that the patient was able to distinguish these gradations with such delicacy, that she was able to assign to every substance its place between two others. This she could do with such certainty, that when I gave her again on the third or fourth day the substances which she had previously arranged in series, she again placed

them in exactly the same places in the arrangement, as she had given them in the first instance; while it is clear here that she could neither recognise or understand anything in this numerous collection of white and coloured powders. She had an equal degree of clearness in her feeling, to anything that we meet with in the vision, for the distinction of tints of colour, or with the ear, for the distinction of harmonious or discordant tones. When we recollect that, in Miss Nowotny, this feeling had received none of that practice by which the sight, the hearing, and other senses gradually acquire, with constant exercise, their full development and susceptibility in the course of a long life, and of which we have learned, in the psychological field, the overwhelming influence on the clearness and distinctness of sensual perceptions,—some idea may be formed of the extraordinary inner acuteness with which this peculiar abnormal feeling must be experienced; and by which we shall hereafter clear up much that at present lies in complete obscurity.

177. Scarcely a couple of dozen substances had been brought into a series in this examination, when I already saw a law develope itself: the substances became arranged according to their electro-chemical values, in such a manner that those standing highest came to the top of the list, the indifferent below, and with a striking disregard of their polar opposition. I will not venture to tire the reader with the enumeration of the whole series of more than 600 substances, but still I wish to select a small number:—the highest, *i. e.* those substances acting most strongly, were: oxygen gas, sulphur, caffeine, sulphuric acid, potassium, phosphorus, sodium, selenium, iodine, cinnabar, lead, and potass. Between the numbers 30 and 100 occurred—bismuth, arsenic, mercury, morphia, zinc, iodide of potassium, tellurium, chloride of calcium, chromium, lithium, oxide of gold, oxide of nickel, tin, iridium, nickel, alcohol, chlorine gas. Between 200 and 400 came—paraffine, rhodium,

acroleine, piperine, creasote, common salt, quinine, brucine, cantharadine, strychnine, anhydrous acetic acid. From 500 to 600—cinchonine, quartz, hippuric acid, mastic, chalk, gum, almost all vegetable acids, sugar, sugar of milk, mannite. At the end of the series stood palladium, platinum, silver, copper, iron, gold, amber, and water. These last were almost perfectly indifferent to *this* sensitive patient. With the small exception of a few rare metals, which very probably were not perfectly pure, all highly polar bodies appeared at one end of the scale, the indifferent at the other ; among which iron, with its magnetic capacities, makes the only exception. Strangely enough, she could make out any distinction between the substances of the positive and the negative pole, in spite of my endeavouring at the end to make her aware of important differences in these, and consequently directing her attention particularly to this. Oxygen gas, sulphur, phosphorus, stood co-ordinated with potassium, sodium, lead, &c.

178. This task, which occupied a whole week, was performed with the patient in a perfectly clear state of consciousness. I now sought to control it by examinations during her unconscious cataleptic condition. Whenever I laid any body in her motionless hand, it reacted upon her ; the indifferent, when not crystallized, left her tolerably quiet; substances occurring nearer to the middle of the series made the hand restless ; those bodies past the middle produced trembling and abnormal twitchings in the hand ; and when I placed in her hand the highest substances, such as sulphur, caffeine, lead ore, iodine, cinnabar, or even the higher standing minerals, like heavy spar, fluor spar, pyrites, or selenite, the whole arm was seized with such violent cramps that it rose up quite mechanically—just like a frog's thigh through which a galvanic current passes, and flung far away the body held in the hand, and then, in the cataleptic manner, remained outstretched in this unnatural position. These

counter-tests prove that the unknown effect of these substances is exactly the same in catalepsy, in their relation to each other, and qualitatively in general, as in the awake condition, but that quantitatively the strength of the action is considerably exalted. What she only experienced as very disagreeable when awake, produced violent spasms in the cataleptic condition. When she recovered, after some time, from these conditions, and regained her consciousness, she invariably complained of pain and deadness in one arm : this was always that one with which the experiment had been tried, of which she knew nothing, and of which she was not informed. The spasms were, therefore, connected with violent excitement and tension, which left behind a state of exhaustion. From all this we have to set it down, that *all solid bodies, in contact with this sensitive person, produced reactions upon the feelings of a peculiar kind, differing in a graduated series according to their different chemical composition.*

179. In the course of these matters, I often made the striking observation, that certain of these bodies began to act, to set the hand in motion, before I had actually dropped them into it, and while I still held them over it. Devoting some attention to this phenomenon, I found that many substances only required to be laid upon the bed at a little distance from the hand, in order to produce reaction upon the patient. Of this kind were sulphur, lead ore, fluor spar, rock salt, cinnabar, grain tin, selenite, arsenic, sal-ammoniac, prussiate of potash, antimony, telluric acid, wolfram, apatite, celestine, white lead ore, cyanide of potassium, sulpho-cyanide of potassium, orpiment. The hand lying near these began to tremble ; this soon increased, and very often became so violent that it approached towards the substance, then dashed this away or became fixed in a tonic spasm. Here, therefore, was distinctly manifested *action*

at a distance, even of amorphous bodies, providing only that they were of high electro-chemical rank.

180. To try how these reagents would act upon the sensitive, while conscious and out of the catalepsy, I made the same experiments the next morning, at the hours in which she usually was in the greatest degree of suffering. All the above substances were brought near her hand, but made no impression on her, even none whatever after repeated trials. She herself covered her closed eyes, to be quite sure whether she did not feel anything when those substances were brought as close as possible to the hand, which had produced contractions and cramps the evening before ; but it was in vain : not until actual contact took place did those very disagreeable sensations begin which I have described above. *Catalepsy itself is therefore a condition which exalts in a disproportionate degree the sensitiveness of the patient to certain unknown qualities of matter,* and matter possesses some hidden quality, by means of which it affects the cataleptic peculiarly in an exalted degree, *even at a distance,* in a manner analogous to that in which it affects patients in the awakened condition, free from the catalepsy, by actual contact.

181. These observations soon received wider development in Miss Maix. Most of the substances which I placed in her hand affected her as warm or cold, as I have already mentioned ; but together with this feeling, which she only received at the touching surface by actual contact, another very frequently presented itself, and this was a simultaneous cooling, like that cool wind which was diffused from many of the bodies I tried (resembling that from the positively electric touch to healthy persons). Sulphur was one of the first of these bodies. When I laid a little piece in her hand, she felt both warmth at the point of contact and a coolness which spread itself all over the hand like a gentle, cool

breeze. This soon increased, extended from the hand up over the whole arm, the face, became perceptible in the other hand, and also seized that arm; then it penetrated through the dress, and was felt on the breast; at last it flowed, through the coverlet, all over the lower parts of the body, and at length even the feet felt the cool emanation which proceeded from the sulphur.

182. I laid the sulphur in an open drinking-glass with a thin bottom, and placed this in the hand of the sensitive. She thus grasped the sulphur without touching it, and was at the same time, at all events in my expectation, cut off from its direct radiation. The drinking-glass, when previously tested, had felt warm, without any emanation. As soon as the sulphur was placed in it, the point of contact of the glass and the hand remained warm, as before, but a cool wind now issued from the glass, on all sides, diffusing itself over the hand. It flowed from all parts of the bottom of the glass which were not in contact with the hand, it seemed to sink down from the sides, and to flow over from the mouth of the glass, thus streaming down upon the hand. This cooling influence, which appeared to penetrate through the glass, was, however, much more agreeable than that coming immediately from the bare sulphur; finer, as if more transparent, the patient said,—purer, and more etherial. It soon penetrated the whole hand, made it cold, then stiff, and persisted for a considerable time after I had taken the glass away. It had at the same time been felt on the face, the other hand, and the neighbouring parts. A piece of selenite, substituted for the sulphur, produced exactly the same effects.

183. When I had removed the sulphur from the glass, and laid it, for the moment, on a tube standing by the bed, in order to perform another experiment, Miss Maix very soon said to me that she could still trace thence the presence of the piece of sulphur. I then removed it to a greater

distance, about a yard away ; she still perceived its presence. Even at the distance of two yards, she could detect traces of the coolness from a piece of sulphur not larger than one's finger. I now prepared a surface of sulphur, measuring half a square foot, in this way : I sent for six of the sticks of sulphur which are used for branding wine-casks, and fastened them, side by side, upon a board. With this improvised apparatus, held opposite to the patient, I could remove, step by step, the whole length of the room, nearly eight yards, and the observer still felt—weakly, it is true, but distinctly—the so-called cool wind flowing on to her from the surface of the sulphur. At this distance she found the sensation to agree exactly with that which was produced on her by the point of a large rock crystal or small open magnet. The effect of the last two was somewhat stronger, but tolerably similar in its kind.

184. The sulphur produced a sensation of warmth, both in the immediate contact and when glass was interposed : I therefore sought for some other substance which appeared cold. Concentrated sulphuric acid was one. When given to her in a glass, she felt great cold at the point of contact ; but when it was removed, she felt the cold air from the acid at a distance of several paces. Nitric acid was also cold in contact : its action at a distance extended half as far again as that of an equal quantity of sulphuric acid.

185. I had still to seek out some body which was neither warm nor cold, but indifferent, when lying bare upon the hand. I found such in paraffine and cane sugar. Cold wind nevertheless issued from both ; from the paraffine to two yards distance, from the cane sugar about one yard.

186. I now went through a quantity of the most different substances with the patient, to collect confirmations and extensions of this phenomenon. A flask of oxygen gas was felt hot, especially when waved about ; it soon made the hand and arm stiff and cramped, was in the highest degree

disagreeable, and spread a cool wind to the distance of half a yard. A so extremely small quantity of a concentrated substance, in which we yet in part constantly live, had here, as with Miss Nowotny, such a strongly-marked action ! I possessed a portion of chromic acid in a glass tube about three quarters of an inch thick, sealed up at both ends. She found it burning hot through the hermetically closed glass, but diffusing cool wind to a distance of several yards. Phosphorus in water like sulphur, only weaker, cooling at three yards. Selenium almost like sulphur, radiating coolness to six yards from some small fragments. Tellurium behaved very like sulphur, but gave a cold wind the whole length of the room. Charcoal had the same properties in disproportionately weaker degree. An empty drinking-glass felt warm to the hand, without any wind. When covered with a watch-glass, however, a cool breath flowed down from the glass over the hand ; when the watch-glass was removed, the cooling again ceased. It was therefore the enclosed air which produced the cold to the hand. I modified this experiment in various ways, but it always yielded the same result. The oxygen of the air somewhat warmed, when at rest, by the hand, here acquired some little excess of free force over the outer cold and moving air ; and since the oxygen always acted strongly here—nay, is even far the most active of all bodies, the very slight elevation of temperature, the effect of which we have already become acquainted with (§ 177), was sufficient to produce a perceptible manifestation.

187. Almost all the metals felt warm by direct contact, but at the same time all diffused emanations of what the patient called cold wind. They follow one another, in the order of decreasing strength, about in this manner : chromium, osmium, nickel, iridium, lead, tin, cadmium, zinc, titanium, mercury, palladium, copper, silver, gold, iron, platinum. A plate of copper of about half a square yard sur-

face, placed near the bed of the patient and opposite to her, produced a lively, cool, fresh wind, which gradually appeared to flow very agreeably through the whole of the bed. A zinc plate of equal size produced the same effect less strongly. Still weaker was the action of a lead and an iron plate. But when I placed before her a quicksilvered mirror, at first with metal coat next her, this worked very strongly upon the observer; the glass side of the mirror, however, acted still more strongly, the emanations from this being again that fine, altogether agreeable coolness, which we became acquainted with above (§ 182), when the effects of sulphur and selenite were conveyed through glass; the patient felt herself imbued with the agreeable feelings from head to foot.

188. I instituted less extensive experiments with Miss Sturmann, but the few were decided enough to afford positive confirmation. Oxygen gas was found very hot in contact; sulphur, selenium, iodine, bismuth, chloride of gold, iridium, oxide of gold, and morphia, were all found warm in contact with the hand; antimony, mercury, zinc, copper, tellurium, lunar caustic, bismuth, gold, lead, tin, and iron, appeared cold in their different gradations. Potass gave an uncertain result. Crystals of calcareous spar, double spar, arragonite, tourmaline, and rock crystal, were polar, warm at one end and cool at the other. I tested with her surfaces of half a square foot of sulphur, lead, zinc, copper, silver, and gold; and all these substances she found to radiate either hot, warm, tepid, or cool emanations, at distances of a yard and more. Palladium diffused a fine cool wind, which issued from it on all sides. When I went to her during attacks of catalepsy, and placed in her hand sulphur, selenium, tellurium, mercury in a glass, antimony, or zinc, she struck out, as Miss Nowotny had done under similar circumstances, (§ 178), and threw the objects away. But when I laid them near her hand, without touching it, this began to tremble and shake, and gradually became con-

tracted, and in some degree cramped ; thus exactly as in Miss Nowotny, § 179.

189. Miss Atzmannsdorfer found a cold feeling from sulphur, selenium, pyrites, antimony, zinc, lead, Egyptian jasper, common salt, alum, potash, and brucine ; on the other hand, platinum, silver, iron-bar, copper, gold, and mercury, warm. A cool wind was diffused to her from some distance by selenite, fluor spar, pyrites, alum, tellurium, lead, common granite, and gallic acid. The wind seemed to her to flow out from all sides of the objects.

190. Mr. Schuh found fragments of sulphur and powder of it equally warm on contact. Oxygen, iodine, bromine, kupfer-nickel, cyanide of gold, cyanide of potassium, he found warm, and quickly exciting head-ache, which gradually increased to an insupportable degree. He arranged a small number of minerals according to his feeling of the progress from cold to warm, in the following order : pyrites, fluor spar, calcareous spar, iron glance, staurolite, rock crystal, tungsten, Schörl, sandy calcareous spar from Fontainebleau, heavy spar, topaz, common salt, analcim, and felspar. On sulphate of copper and carbonate of soda, he found points from which coolness seemed to issue. To guard himself from any possible delusion he had them wrapped in paper, and then tried whether he could find the cool places again in these envelopes. When he opened them he was fully satisfied that he had found out exactly the same points again. He felt distinct coolness to issue from sticks of brimstone at a distance of ten inches, as also from a little layer of oxalic acid ; on the other hand, warmth flowed to a similar distance from leaves of eight square inches surface of tin, lead, copper, silver, and gold. Silver and gold money also, and steel instruments, were warm to him, when held at some distance above the hand. He could not bear to stay long before a large *cheral* looking-glass, extending down to the ground ; the emanations from it soon affected him with

headache, stupefaction, then with pain in the stomach ; when he went to the back of the mirror, the disagreeable feelings seized him much more quickly. Two hours later he tried the same before a large mirror attached to a wall ; all the same discomfort presented itself still more quickly and strongly.

191. Mr. Studer surrounded with his hollow hand a number of substances, or held them near to his eyes, with which he was far more sensitive than with his hands, since he could well distinguish coolness and warmth. In this way he felt, without contact, coolness from sulphur, pyrites, selenite, tellurium, chloride of calcium, sulphate of oxide of iron, sulphuret of potassium, oxalate of potass, Seignette's salt, rock crystal, and sugar ; warmth at a distance from gold, silver, copper, tin, lead, zinc, potassium, and solution of potass.

The joiner Klaiber felt sulphur, sulphuric acid, selenite, rock crystal, &c., cool at a distance of ten inches ; on the other hand, gold, silver, copper, tin, zinc, lead, solution of potass, &c., warm.

I led many other persons who visited me to these objects, and made some of them go through them by way of test ; in the end I regarded two selected substances as the representatives of all the rest, and of the two principal classes of these, namely, sulphur and gold. I kept by me a surface of each about six inches square. Every one whose hand I placed above these at a distance of about three-quarters of an inch, declared, almost without exception, that the sulphur evolved coolness and the gold warmth. I have permission to name some of these persons. M. Kotschy, the well-known oriental traveller, felt a very marked cold from the sulphur surface, and warmth from the gold leaf. Without knowing anything about it, he complained of a strange pricking which the sulphur produced in his hand, although he did not touch it. Dr. Fenzl, the well-known distinguished botanist, felt

the distinction of cold and heat between the two bodies very clearly. Mr. Incledon, an English private teacher in Vienna, not only experienced the same in a very lively manner, but described the pricking which the sulphur gave him as very similar to the sensation when the hand is recovering from what is called being *asleep*, and gives only isolated, scattered pricks.

192. Up to this point the phenomena exhibit a mass of variations; but among these inconstancies something very constant is seen to exist. The alternation of heat and cold appears inconstant in substances of one kind with different observers. This part of the subject requires a special investigation to clear it up more exactly. I therefore exclude it from the present treatise, keeping it for an early task, and here only lay down the general but constant *fact*, that all the substances subjected to the trial reacted with apparent differences of temperature upon the sensitive persons, without respect to being cool or warm.

I next succeeded in bringing these phenomena more clearly to light than with any of the former witnesses, with Miss Reichel, and in making them so clear that all that I have said about the other sensitive persons might be passed over, were it not that observations of the kind can, from their nature, only acquire stability by a greater number of repetitions of the most varied kind. Miss Reichel consented to come and pass some time here at my country residence, Castle Reisenberg, near Vienna, and thus gave me an opportunity of carrying out numerous experiments, with the help of physical apparatus, in a much more regular and complete manner, than could be done in strange houses and sick-chambers, often under very inconvenient circumstances.

193. In order to render the following experiments comprehensible, I must give some little account of the localities of my residence, in which they were made. The castle, as

it is called, is so built that in front there are two rows of nine rooms, connected with one another by doors in a straight line. Each of the rows is about fifty-three yards long, and ends at both sides with balconies, each of which are about ten feet broad, giving together a length of twenty feet; so that since the doors to the balconies are in a line with the doors of the rooms, a straight space of nearly sixty yards can be obtained for experiment, in a place where the air is calm. Working with wires which require to be held at some distance, the length of the line may be doubled by means of the other series of rooms; thus giving convenient use of almost 120 yards. I placed Miss Reichel at one end of this line, and began to experiment with her on the extent of the action, at a distance, of the substances. With a small horse-shoe magnet of about two and a half inches length of limb, it was necessary for me to remove more than eight feet from the observer before the action upon her began to decrease. With another horse-shoe magnet, eight inches long in the limbs, and about one and a half inch broad, I was obliged to remove to a distance of twenty yards from her. A heavy nine-fold horse-shoe, which at that time would support about forty pounds, required me to go thirty-three yards from the observer, therefore to six rooms off. Comparative experiments with a magnetic rod of forty-two inches long, afforded as its distance of action on the patient, for the positive (southward) pole, twenty-six yards; for the negative (northward) pole, twenty yards.

194. In the next place I wished to examine the iron rods which served, in a wooden case, as a parallelogrammatic armature to the last-mentioned magnet. One of these was quite like the magnetic rod itself in shape and size; the two others were of the same sectional magnitude, but each only about one-fifth part of the length. When

approached to iron-filings they exhibited nothing, and behaved merely like unmagnetic iron ; but the sensitive patient, nevertheless, felt the large armature—

One end at	26 yards.
The other end at	22 ,,

The cross pieces—

One end at	9 ,,
Both together at	17 ,,
The other end	12 ,,
Both together	23 ,,

The simple armatures, therefore, acted nearly as strongly upon the patient as the magnetic rod itself, and must, therefore, be placed almost in the same rank for crystallic force. Any delusion, which might be suspected from this surprising result, is out of the question, since it was impossible that the observer could distinguish at the distance whether the object was a few yards nearer or further off, and the results all harmonise under a common point of view, and are thus controlled.

195. Three days later her excitability became much increased with the advent of menstruation. I repeated the measurement of the distance at which the patient was affected by the magnet. But it was necessary now to make use of all the rooms and both the balconies, and after I had used up the sixty yards of my rectilinear space, she felt the effect of the large nine-fold magnet still so vividly, that she estimated that double the length would hardly suffice to reach the limit of the sensation. I now tried the half-square foot of brimstone. It had affected Miss Maix at a distance of eight yards, but the length of the chamber did not allow of its being removed to a greater distance in that case. Here, however, the sulphur now produced a sensation of

cooling at distances up to forty yards. Astonished at this, I tried a copper plate of about four square feet of surface ; the effect of this extended, as warmth, to thirty-one yards.

An iron plate of six square feet gave warmth at a distance of	49 yards.
Lead foil, such as is used for packing tobacco, six square feet	25 ,,
Tin foil, six square feet	23½ ,,
Zinc plate, six square feet	21½ ,,
Silvered paper, pure, one square foot .	7¾ ,,
Gold paper, pure, three square feet .	23 ,,
An electrophorus cake of about sixteen inches diameter	33 ,,
A common mirror containing about ten square feet of surface	35½ ,,
A small flask of oxygen gas	6

A quantity of other things,—brass objects, porcelain vessels, glass work, stone tables, bright-coloured wooden plates, outspread linen, open or closed flaps of doors, chandeliers on the ceiling of the room, entire trees, approaching human beings, horses, dogs, cats, pools of water, especially when they had been shone on a short time by the sun ; in short, all and everything that presents itself as material in space, acted upon the sensitive girl, flowing either as a cooling or warming influence on to her,—in many so strong that it attracted her attention and became burdensome, in many so weak that when she had become accustomed to it she thought no more about it.

196. This extraordinary phenomenon, where a human being became distinctly aware of the presence of a bit of metal plate, a couple of leaves of gold, or a piece of tin foil, without seeing it, at a distance of a hundred paces, was so astonishing to me, that I could not repress my great amazement,

which, however, only produced a laugh from Miss Reichel, who had been accustomed to all this, without interruption, during her whole life. All my sensitive patients, sick and healthy, had, without exception, experienced the same sensations and perceptions, under favourable circumstances, more strongly or more weakly, in a wider or narrower extent, according to the subjective excitability of the individual. Apparently all this was nothing else than a manifestation of the often-mentioned so-called crystallic force in a—perhaps modified—more general form, and the conclusion which was drawn above (§ 178), from the investigations with Miss Nowotny alone, now obtains its extension and validity for all the persons subjected to the trial:—namely, that *ALL solid substances, in contact with sufficiently sensitive persons, produce reactionary sensations of a peculiar kind, differing in degree according to their different chemical composition; that these reactions are principally expressed in apparent differences of temperature, such as cool and tepid, with which a sensation advances by more or less equal steps from pleasant and disagreeable; and that finally these reactions have every resemblance to the sensations which are produced by the force of crystals, magnets, hands, &c.*

The essential matter now, in order to demonstrate the identity of the cause with the crystallic force, is to investigate the rest of its characteristics.

197. Is this universally-distributed force transferable from one body to others? capable of being accumulated, as I have often expressed it, without by any means intending to pledge myself to regard it as material? I made a strange first experiment, which led to the answer to this question, on Miss Maix. She received a visit from her sister, Miss Barbara Maix. The latter was healthy to outward appearance, but suffered from a variety of nervous affections. She took the hand of the patient, but had not held it long before

she let it go again, suddenly, with a shudder. "What in the world have you in your hand that pricks me so?" she cried. There was nothing there. Immediately before this the patient had been holding a piece of sulphur in her hand. This pricking was repeated as often as the hand was reached out. And when it gradually died away, it could be renewed, at will, by the patient holding a piece of sulphur again in her hand for some time. This shows clearly that the imaginary pricking, which subsequently presented itself very often, was nothing else than a transfer of certain unknown qualities of the sulphur into the hand which held it, and which were then reflected to the second hand possessing the same excitability for sulphur and similar things. When I myself grasped sulphur for some time in my hand, and, after a pause, took Miss Maix's, she experienced the pricking sensation from me, and recognised what I had previously held.

198. This was shown more distinctly by experiments derived by reasoning from the above. I placed the German silver conductor in Miss Maix's hand, and allowed her to become accustomed to it in the usual way. I then made her lay it down anywhere, and placed a piece of sulphur upon it. After some minutes I again took this away, and allowed the sensitive girl to grasp the conductor again. She immediately recognised acutely the feelings which the sulphur always produced in her, and *therefore* something had passed from the sulphur into the conductor, became fixed there, allowed itself to be carried forward by the conductor, and reacted upon the hand of the sensitive.

199. The experiments with Miss Reichel gave exactly similar results. In the first place, I repeated with her the hand experiment of the sisters Maix, without telling her anything about it. I took a roll of sulphur in my hand, and grasped it for five minutes. I then laid it down, and with this hand took hold of that of Miss Reichel. I had

not hold it long, before she cried out, and complained that my hand was full of needles. She experienced the sensation of innumerable fine prickings all over the surfaces in contact,—an exact confirmation of Miss Maix's observation by the hands of two other persons, and thus a striking proof of the extent to which objective reality lies at the bottom of these phenomena. This hand of mine, which I carefully kept from touching anything else in the meanwhile, had not become pure again, after a full quarter of an hour, but felt prickly still, though in a weaker degree. It had, therefore, received an accumulation of the force of the sulphur, which it retained for a considerable time, and which it lost very slowly.

I placed a pair of steel scissars, which she simply found warm, upon some sulphur, and let her take hold of these after some time. The scissars had now become cold, and pricked the hand of the observer, as above. I took a glass tube, forty inches long, which was very slightly warm to her, touched one end for a minute with sulphur, then took it away and gave the other end to the sensitive girl to feel. She now found this very cool; after five minutes, I let her take hold of it again; the coolness was diminished, but still existed distinctly. After the lapse of half an hour the glass was felt again, and had again acquired its original slight degree of heat. Sulphuric acid applied in a similar manner to another glass tube, not, however, brought immediately in contact with the tube, but with the interposition of the side of the glass bottle, had the same effect.

Caffeine, in quantity not more than a few hundredths of a grain, placed in a small thin glass tube, and after a short time taken out again, left the tube considerably warmed.

My young daughter O. laid one hand, which had been tested previously, for a short time upon a number of layers of gold paper, and then gave it to the patient. She found its warmth greatly increased. Felt again at the end of three

minutes, she found half of the warmth-exciting cause still in the hand ; but after seven minutes there was none, and the hand had regained its natural condition.

A glass full of powdered gum, itself weakly cooling, was placed close beside a bottle containing potassium in naphtha, which belonged to the strongly warming bodies. After the lapse of a few minutes it gave a sensation of alternating cold and heat ; it seemed as if a part of the gum had been overpowered by the potassium, while the rest, perhaps the inner portion, was not affected in the given time.

Gold leaf always gave her warmth in a strong degree. I placed an empty glass bottle, which by itself she found cool, upon the gold leaf,—pure, be it understood, not the alloyed, which generally occurs in commerce. I turned it about on all sides, from time to time, to make contact at all parts. I then made the observer grasp the bottle. She no longer found it cool, but very remarkably warm. The gold leaf had inoculated the glass with its warming quality.

I held selenite, itself cold, for some time in my right hand ; it did not notably alter. Enclosed in my left fingers, it acquired the power of giving out warmth. Oxide of copper in a glass bottle, cold by itself, underwent a similar change in my left hand.

I placed potassium in naphtha, warm by itself, in close contact with a quantity of fragments of sulphur. After some minutes it had become perfectly cold, as cold now as it had been warm before. The sulphur had therefore not merely removed the apparent heat of one of the strongest bodies, but so overpowered it that in addition it had implanted in it its own peculiar coldness. This accumulation also manifested a duration of several minutes after the separation.

The German-silver conductor, itself slightly warm, was placed in common salt. After a short pause it came from it cold. Fluor spar was then laid upon it ; this made it still

colder. I next covered it with abundance of bits of sulphur for a minute ; again, when it had been taken out, it presented an increase of its coldness.

Finally, a roll of sulphur was applied against potassium for a short time. After the separation it was observably less cold. Left longer in contact it became cold and warm, simultaneously, in different parts. Then, laid upon my left hand for some time, it completely lost all its coolness ; and when I at last enveloped it in the gold leaves, and kept it there for a while, the roll of sulphur even became hot.

200. Miss Atzmannsdorfer always found copper rather tepid. One day, however, that I gave it her to try, she said that she felt it cooling. This was in opposition to the earlier observations ; I therefore waited a moment to seek what might be the cause. The copper was a thin, smooth plate, and lay upon a polished table of walnut-wood. I made her feel the table, on different parts of the leaf, of the edge, and of the feet ; she found it cool in all parts. I took the copper plate away, and left it for a while on a seat cushioned with silk stuff. When she again took hold of the copper she found it tepid, as all other copper always was. I now placed it on the table again ; at the end of five minutes she found it cold again. I stretched the copper between the cheeks of a little vice ; after a short interval it felt warm again. Whenever it was brought back on the table for a little while it became cold again. It was evident that the great mass of the cold-reacting table overpowered the magnetic heat of the weak copper plate, and the latter became cool, by accumulation of charge, every time it was involved for a certain period, in the sphere of action of the walnut-wood. By a great number of experiments, therefore, I established, that *the property of bodies here in question may be transferred from one to another by mere contact, exactly like the so-called crystallic force.*

201. We have already become acquainted with the power

of acting at a distance, in the magnet, crystals, the fingers, the heavenly bodies, &c., excercised by the force under discussion ; we have even seen matter in general exercise it on the cataleptic Misses Nowotny, Sturmann, and Atzmannsdorfer ; also on Miss Maix and Miss Reichel in the free, conscious state : the question now arises, whether the force is, in like manner, capable of transference from one body to another, at distances, without contact ? To decide this I placed beside the German-silver conductor a roll of sulphur of equal length, at a distance of three quarters of an inch, without contact at any point. After a few minutes the sulphur was removed, and the conductor grasped by Miss Reichel. It was warm before, but now she felt it perfectly cold, as much so as if it had been in immediate contact with the sulphur. At the end of four minutes it still retained almost half its coolness, which did not wholly disappear under a good quarter of an hour.

Sulphate of copper, broken small and in paper, was laid beside the broad 40-inch glass tube, at the distance of ten inches, all contact being avoided. In five minutes it was taken away, and the tube taken hold of at both ends by the sensitive observer. In spite of this relatively considerable distance she found the glass to have been rendered cool by the sulphuric acid salt ; and this persisted several minutes.

I learnt from these experiences that I must avoid using my own hands in these delicate experiments, on account of their magnetic power, to guard against any complication ; at the same time I recognised here hints for the explanation of many anomalies in my previous researches, wherein my sensitive observers so frequently did not agree together in their statements of heat and cold : it might often have been my own hands which altered the natural condition of bodies, by conveying their own force on to them. On this account I let my daughter H. place her hand in that of Miss Reichel, and accustomed the latter to it ; then held the same hand

over a surface of sulphur, without contact. At the end of two minutes she offered it to the observer. That needle-like pricking which actual contact with sulphur had produced in all the other cases, immediately presented itself in the hand, together with coolness. The same experiment was made with the same results by my daughter O. The patient experienced the pricking from the hand of the little girl that had been waved over sulphur, at the end of half a quarter of an hour. I pass over other similar experiments.

202. This proves, that *the transfer of the often mentioned essential force from one body to another is effected without contact by the mere approximation of them toward each other.*

203. The conduction of it through other bodies is certainly sufficiently demonstrated by all the preceding experiments ; but I will here insert a couple of remarkable confirmatory examples. I connected Miss Reichel with a copper plate by an iron wire thirty-three yards long and one-twelfth of an inch thick, she holding the other extremity in her hand. I brought successively on to the copper plate, zinc, tin, lead, gold, mercury, potassium, potash, potash ley, and minium ; all delivered warmth to the hand through the plate and along the wire after the lapse of half a minute : on the contrary, sulphur, carbon, oxalic acid, aqua regia, sulphate of iron, and common salt, gave cold in the same space of time. The sensation likewise began to vanish after the interval of half a minute, when the objects were removed, and required several minutes for its complete disappearance. Sulphur gave a sensation of cold when only brought into the neighbourhood of this long conductor. The German-silver conductor alone, laid upon the copper plate, gave warmth ; but when I previously kept it for a few minutes upon sulphur, and then brought it upon the copper plate again with my right hand, it gave a persisting cold. I

rolled up an empty glass bottle, which by itself delivered slight cold (different glasses always varied between cold and warm), for a few minutes in gold leaf; freed from this, and brought with my left hand on to the copper plate, it delivered lively warmth to the distant hand of the observer. Taking a large glass tube forty inches long, and wide enough to admit the hand, I introduced, one after another, a quantity of chemical preparations of the most varied kinds, solid and fluid, together with the glass bottles containing them. The sensitive patient described, as occurring at the other end of the tube, which she held in her hand, sensations exactly the same, in order, as those I had marked down from her in the earlier experiments, with the immediate contact of them with the hand. In another way, I gave her a thin glass stirring rod like a thermometer tube, but solid, between her fingers, and made her dip this, in order, into the contents of many glass bottles of amorphous chemical preparations of all kinds. Her account of the sensations produced by the glass rod in her fingers, agreed, word for word, with those on the broad glass tube; so that a rod of this kind affords the most convenient of all means for the purpose, as dry, fluid, volatile or bad-smelling things can be tested with it, as to their magnetic value, rapidly and without the least difficulty. Miss Maix also furnished me with a few proofs referable here. I had connected a copper plate with her hand, by means of a copper wire. As I placed upon its surface, partly immediately, partly in bottles, sulphur, sulphuric acid, selenium, sugar, silk, wet linen, &c., she described, successively, the same sensations as she had experienced when she had the same substances immediately in her hand.

My daughter Ottone gave one hand to Miss Reichel, and held the other over a surface of sulphur, without touching it. After the lapse of half a minute the latter found the hand of the former become cold; and at the end of a whole

minute the pricking sensation from sulphur, already often mentioned, made its appearance. An hour later this experiment was repeated, with the modification that the hand was held over a number of layers of gold leaf instead of sulphur, this time also with careful avoidance of contact. At the end of about half a minute again, a sensation of warmth passed from the hand of the healthy person into that of the patient, which continued to increase for a minute, and then remained steady.

204. All this testifies that *the force which emanates from amorphous substances of all kinds, is conducted and carries its efficiency with it through matter of every kind, even through living human beings; nay, that this holds good not only in case of actual contact, but even with mere approximation of one substance to another.*

205. Capacity of accumulation, coercive power, &c. need no further illustration, since these are already discussed by implication in the foregoing.

206. Consequently only the luminous phenomena remain to be *tested*. These have actually shown themselves convincingly enough. When I undertook experiments on the luminosity of crystals in the dark, with Miss Reichel, she led me to notice, by remarks upon the bolts of the doors, the fastenings of the windows, and other metallic objects of which she spoke, that she saw all such things. When I brought a freshly-cleaned copper vessel to her, I accordingly heard that she saw it luminous all over, and that a fine green nebulous flame waved immediately above it, streaming out beyond the borders of the copper. I at once undertook a long investigation of this, which I continued and repeated for confirmation at different times, partly in Vienna, partly here, in my summer residences. From this it resulted that all metals, generally speaking all simple bodies, without any crystalline condition, appeared luminous in sufficient darkness to the eyes of the highly sensitive; that compound

bodies do also, but weaker and weaker the more complex they become. To test this on different sides, I brought a great number of things into the dark, one after another. Miss Reichel saw the substance of most metals with a red luminosity, as if glowing ; some of them white, some yellow. Over all waved a delicate flame, which moved backwards and forwards over them, was of different colour in different metals, but was definite for each, and could be driven about by a current of air caused by the hand or the breath. The more complex bodies only exhibited flames at their points, when they were crystallized, otherwise they were mostly either surrounded by a luminous vapour, or even only themselves bright and luminous, as if glowing. The darkness gave me an excellent opportunity of controlling the statements rigidly. I brought to her in the dark, at different times, different, and then, alternately, again the same substances, which no one could recognise in the dark, and it was necessarily clearly manifest in this way whether her later statements agreed with the earlier. This was perfectly the case in reference to the luminous phenomena generally ; their strength and their form ; also on the simple substances, in reference to their colour ; but not quite so in the more compound. The colour of the luminosity appears, like that of the flame of combustion, to depend upon the quality of the matter from which it issues, and upon every significant intermixture. Miss Reichel always found the following substances alike, as often as I held them before her in the dark :—

Copper plate, red luminous, with green flames over the whole surface, particularly at the borders, flowing over the breadth of three-quarters of an inch to an inch and a half, the flames rolling in from the middle toward both sides.

Iron plate, red luminous, the flame of the entire surface rolling in toward the middle, and somewhat elevated there, half a hand high, brilliantly playing in red, blue, and white.

Bismuth, red luminous flames, and marginal flames bluish-red.

Zinc plates, pale red luminous, the flame opaque-white, reddish-blue at the points, jagged at the edges, uniting into a tuft at the corners.

Tin, cuttings of tin foil, flames dirty bluish white, streaming out weakly at the edges, with tufts at the corners.

Lead, blue luminous, flame dull blue, little weaker than the tin at the borders, without tufts at the corners.

Cadmium, white, somewhat bluish flame.

Cobalt, weak blue.

Silver, upon paper and burnished, white luminous, flame white, a finger's length high, not rolling together, the same at the borders as in the middle, without tufts at the corners.

Gold, upon paper and burnished, white luminous, flames white, two fingers' length high, not rolling together, border like the middle, no corner tufts.

Palladium, strongly blue luminous, with a pale blue vapour.

Platinum, white luminous, with pale blue flames.

Antimony, white luminous, with bluish flames.

Rhodium, red, with pale yellow.

Tellurium, red luminous, white at the border, no flames.

Osmium, red luminous, with greyish red vapour.

Mercury, red luminous, with strong white flames and white vapour.

Chromium, green, passing into yellow.

Nickel, red, rising up to greenish yellow.

Titanium, brilliant red, passing into violet.

Arsenic, blue-red, pale red vapour.

Iridium, blue luminous, flames reddish blue.

Sodium, red luminous, flames dull white, towards lilac.

Potassium, red luminous, yellow-red on the cut surface, flames large.

Charcoal, red luminous, red marginal flames.

Diamond, flames white, blue internally, upper points red.

Iodine, red luminous, when shaken passing in some degree into green.

Selenium, bluish red, flames blue.

Sulphur, flames blue, with opaque white vapour.

A glass box set with silver fittings appeared to the observer as if full of fire at night ; white flames flowed from the whole frame-work all over the surface.

All these results I found always the same in numerous trials, when the darkness was perfect : when this was imperfect, however, slight variations of the appearances occurred, bluish red became blue, and the like. On the other hand, the coloured luminosities did not agree so completely in compound bodies, often even varying, and therefore I can give no account of them until I have subjected them to fresh and more fundamental trials. In particular, the same alkaloids, prepared by different hands, often presented essentially different colours in their light, which apparently depended, therefore, upon their different degrees of purity.

In general these lights and flames had always something of electrical light, so that the colour, which like the latter varied about between red, blue, green, and yellow, was frequently very difficult to determine with accuracy. It had every resemblance of aspect to the magnetic and crystallic flame, and was regarded by the observer only as a lower degree of those to her so well-known appearances, to which she had been accustomed from her childhood, and of which she, at the advice of her dead mother, had hitherto never communicated anything to any one, for fear of being regarded by other people as supernatural and haunted.

207. It follows, consequently, that all fluid and solid, therefore all bodies of any density generally, give out ema-

nations of light in the form of flames, appearance of glowing, and vaporous luminosity, in the same manner as the magnet, crystals, &c. &c.

208. In order to complete these examinations of the whole of material things, it was necessary to turn a glance to the starry heavens. We have seen in the fourth treatise the important influence exercised by the sun and moon ; this necessarily led me to the idea of investigating whether all the stars which shine in the heavens, collectively, were wholly without action, and whether some weaker display of force, proportionate to the distance, which possibly might be detected in a smaller degree, might not perhaps correspond to the mighty influence exercised on our planet by the former larger and more proximate heavenly bodies.

209. At the windows of my dwelling, which afforded an uninterrupted prospect toward the east and south of from twenty to thirty miles, where I placed Miss Reichel at night, when the sky was clear, she at once recognised an undoubted influence, as I had conjectured. I repaired with her at eight o'clock in the evening, in the middle of October, to the neighbouring free mountain heights, where there was a wide prospect all round. There was no moon, and the air was perfectly still. She found coolness to come to her from some parts of the sky, and warmth from others. This was repeated on different nights and at different hours ; soon after sunset, then at nine o'clock p. m., twice at midnight, once in the morning about four o'clock, and just before sunrise. Generally speaking, she stated that soon after sunset, namely, at six o'clock, the direction toward the west was most vividly cold ; but just before sunrise, likewise at six o'clock, the direction toward the east ; that long after sunset, about nine o'clock, north and north-west were the cooler, south and south-east the warmer parts of the sky ; but some time before sunrise, about four a. m., north and north-east were the cooler, south and south-west the

warmer directions ; lastly, that at midnight the north was cool, the south warm, but east and west so nearly of an equal apparent temperature, that the east could only be felt a little warmer than the west. An observation which was to have been made between two and three A. M., but which did not take place, would most likely have given east and west pretty nearly of equal temperature.

210. This alternation of the results was evidently an effect of the place of the sun. We know from the fourth of these treatises that the rays of the sun give out cold wherever it was nearest ; the west in the evening, the east in the morning, the greatest coolness always existed ; at midnight, when the sun was in its lower culmination, the difference was almost effaced ; but there still remained some after-effect of the sun in the west, which it left behind up to that time, and a complete neutralization was not to be expected before three o'clock A.M. That this alternation between east and west is really to be ascribed to no other cause, is proved by the observation that these sensations developed themselves just in the same way when the sky was covered with clouds. In all these cases, however, the north remained constantly cold, the south warm ; and when I questioned her minutely as to the direction of the two, she always pointed with her hand in the direction of the magnetic, and never of the astronomical meridian. In particular, she asserted that a clearly defined streak of the greatest warmth was to be detected towards the south, projecting itself from the remaining space. Even at noon she found the direction of the magnetic south the warmest, and the diametrically opposite, that is, the north, the coolest of all the points of the compass. This affords a clear index how these results are to be interpreted in a theoretical examination of them.

211. But these half telluric, half solar phenomena, must not be confounded with the astral, with which they are complicated in our sensations. When I stood at night with

Miss Reichel under a bright starry sky, she described the milky way as affecting her distinctly with coolness ; as also the group of the Pleiades, the region of the Great Bear, and others, and the broad starry vault in general as cooling; particular stars alone, on the contrary, warm : these were always stars of the first magnitude ; and when I examined her about them with the dyalite, I found Saturn with his rings, Jupiter with his four satellites, Venus,—in short, in every case a planet. Experience, therefore, shows that all stars with reflected light appear warm to the sensitive, while all others with proper light are cool. This ranges itself, then, very beautifully with the experiments made before, when the moon gave warmth, the sun (that is, the fixed star) coolness.

212. It was even possible to warrant this by certain reactions. Gazing at Jupiter, as at all brilliant light, was unbearable to her for any length of time. Of all the stars together, she said that they acted upon her in combination like a rather weak magnet, not merely in front, but behind, upon the spine ; principally, however, on the head, where she was most highly sensitive to all magnetic influences. I connected a copper plate of about a foot square with a long brass wire, which led to the sensitive, whom I had shut up in darkness on the staircase. The wire gave out at its extremity, from the copper and from itself, a small flame ; but when I let the light of the stars fall on the copper plate, without making this known to the patient, she informed me after a short pause of the rising of a slender flame to the height of more than a span. It rose and sank again as I placed the copper plate, in the starlight, or removed it. When I took a zinc plate instead of the copper plate, I had the same results with the same alternation, only weaker. The plate furnished corresponding effects upon the feeling. The wire carried from it became cooler, when the starlight fell upon it, more when no large planet could shine upon the

plate, less when one of these partly neutralized the collective action of the stars.

In these observations there is nothing which should be very surprising after the contents of the preceding treatises; but they are certainly a beautiful voucher on the one hand for confirmation of that which we have already observed in the sun and moon; on the other hand, of the fact that the whole material world, even that external to the earth, acts upon us with just that same force, which displayed itself as existing in all terrestrial matter: finally, that we *stand in connexion with the universe by a new, hitherto unsuspected reciprocation*; that consequently the stars, also, are actually not altogether without influence upon our sublunary, perhaps even practical world, and the proceedings of many heads.

213. Thus we arrive at the concluding result of this treatise:—In the same manner as the capacity dwells in the magnet, crystals, organic beings, the sun's rays, heat, electricity, &c., which have been recognised as special sources, to display characters of an unknown force common to them, so *has this force its seat in all the investigated, most dissimilar, and thus doubtless also in all even aeriform amorphous matter, the heavenly bodies themselves included, and takes its place, therefore, as a perfectly universal and all-pervading force of Nature*. In the first ten sources, we see it appear *concentrated in isolated points of the material world*; here, however, we recognise it as *an universal adjunct of all matter in variable, unequal distribution*.

214. Whether now this *natural force extending over the universe* is a totally new, or a hitherto hidden modification of a known one, or whether it is a complication of some of the already known, in a still uncomprehended collocation—this, and much else of importance that still remains in question, I leave untouched for the present. I have now arrived at the point, where all the sources from which I have seen it

evolved, are combined and included. In the succeeding treatises, I shall compare them one with another, and strive to develope them in many relations which I have as yet only partially indicated; higher judges will then perhaps undertake to pronounce judgment on the whole.

215. In conclusion, I will further venture to make an effort toward the removal of the difficulties of language connected with subjects of this kind, and with which I have manifestly been struggling all through this work. In the cases where the force, now in question, has been seen to present itself, in isolated manifestations, during the last seventy years, it has had the greatest variety of names applied to it, almost all of which have been derived from certain resemblances or complications with magnetism. It has always been regarded as more or less identical with the latter. But, from what I have unfolded, it is seen that it has no more identity with this, than magnetism has with crystallization, than crystallization with electricity, electricity with affinity, than heat with light, &c. We do, indeed, suspect the final unity of all these dynamics in the ultimate, higher instance; but at present we are far distant from this desired goal of natural science: we cannot even fill up the gap which exists between magnetism and electricity, which appears so small that one imagines that one can reach with the hands from one side to the other. But so long as an empty iron rod, which will not support an iron filing, displays as much power in regard to the force, of which we are treating, as a powerful steel magnet of equal size, § 194; so long as magnets and crystals are met with acting with equal strength upon the nerves, the former of which will support masses of iron, while the latter will not lift up a filing, §§ 37, 42, 43, 44, and no scientific account can be offered of this vast distinction, so long will the two forces remain essentially different, so that we cannot examine them

under a common point of view ; and therefore, for the present, a peculiar fitting name appears to be necessarily required. Leaving the etymological derivation to be justified at some other opportunity, I will take the liberty to propose the short word *Od* for the force which we are engaged in examining. Every one will admit it to be desirable that an uni-syllabic word beginning with a vowel should be selected for an object which occurs universally in an infinity of complex conditions of the material world, for the sake of convenient conjunction in the manifold compound words. The words magnetism, electricity, &c., are by far too long for convenient use in the language of science. When they are lengthened by additions, as in vital magnetism, animal magnetism, &c., it becomes as burdensome as it is false, for these things do not belong exclusively or even principally to life, still less are they identical with magnetism. To that which supports iron, and constitutes the compass, let us leave the old name, with the original conception of a supporter of iron, which belongs to it. If, then, the term *Od* shall be found acceptable, in general use, for the force which does not support iron, and for which we require and seek a name, the nomenclature for all its various kinds of derivation may be easily formed by composition : avoiding all circumlocutions, instead of saying, "the *Od* derived from crystallization," we may name this product *crystallod*, that from animal life *biod*, that from heat *thermod*, that from electricity briefly as *elod*, from light *photod*, and so on, *magnetod*, *chymod*, *heliod*, *artemod*, *tribod*, and for the material world generally, *pantod*, &c. I am quite aware that objections may be urged, here and there, against the grammatical accuracy ; that it might, perhaps, be more correct to say *thermood*, &c. Nevertheless, when it is intended that new words should make their way into practical use, custom and convenience require that the schools

should sacrifice some of the strictness of grammatical accuracy to euphony. It is possible, indeed very probable, that we shall one day succeed in bringing the incommensurable fractions which we now comprehend under the names of magnetism, electricity, crystallization, light, heat, affinity, &c., under a common denominator ; but the numerators will always remain unlike, and therefore it will always be necessary to connect and retain groups of phenomena, which we call magnetism, electricity, &c. ; and thus, whatever may be the ultimate scientific fate of this which I now think it necessary to comprise under a new expression, we shall scarcely at any time be able to dispense with such a word as Od, or some synonymous one in its place.

RETROSPECT.

- a. Not only magnets, crystals, hands, chemism, &c., but all solid and fluid matters without exception, produce sensations of coolness and tepid heat equivalent to pleasure and inconvenience.
- b. The effective force, therefore, does not appertain to particular forms or especial qualities of matter, but it dwells in matter in and by itself.
- c. This force not only manifests itself in contact, but also at distances,—as from the sun, moon, and stars ; so, also, from all matter.
- d. Substances arrange themselves in the order of the electro-chemical series.
- e. In this, the electro-positive substances stand on one side with potassium at their head, the electro-negative on the other with oxygen in the furthest limit : all electro-positive metals occur among those giving warmth, and producing unpleasant sensations ; all metalloids on the cooling, agreeable side.

f. We find here conductivity, transferability, and luminosity with glowing, vapour and flames.

g. Finally, this force is one that extends over the entire universe.

h. Nomenclature. The word Od, odic, with inflexions and compositions.

SEVENTH TREATISE.

DUALISM IN THE PHENOMENA.

216. THE polar opposition in magnets, the dualism in every crystalline form, the symmetrical and sexual opposition in all living organization, made me conceive, even at the beginning of the present researches, that something of the kind might prevail here. The first and most evident character of this was afforded by the constantly recurring sensations of heat and cold, of pleasure and discomfort, which healthy and sick sensitive persons imagined they felt from all material objects. I did not, indeed, find all these persons agreeing as to those sensations from the same substratum, but as to the quality of any, when once they had determined its place among the warm or cold materials, all the sensitive almost always persisted in their first opinion. There must, therefore, necessarily exist here objective causes in respect to the substance, and subjective causes referable to the form of disease, which determined the, on one hand, constant, on the other, inconstant statements. An attempt gradually to advance along the trace of *warm and cold*, in order to arrive, by further investigation, at a certain scientific truth, was consequently surrounded by difficulties of manifold and peculiar kinds. They were only to be overcome by patience.

217. The first question was : What does the expression warm signify in the mouth of the sensitive ? What the term cold ? All the objects which they thus designate are, in every case, of equal thermometrical temperature ; these words, therefore, cannot mark anything real, but must indicate an apparent temperature, and the expression is there-

fore to be taken in a figurative sense ; it signifies an *effect upon the sense of feeling, which resembles that of heat and of cold*, depending upon some unknown cause.

218. Miss Sturmann found both a flask of oxygen gas and a piece of sulphur hot ; Miss Reichel found them both cold ; and Miss Maix found both hot while lying in her hand, but diffusing a cold air around : in the collective idea of difference of temperature in relation to the temperature of the air, at each time they all agreed ; but as to the determination of the degree I received very different accounts ; from three observers three different statements, and all three kept constantly to the same statements at all times and in every repetition.

219. From this it clearly followed, that not only was the objective cause residing in the matter present in unequal degrees in different substances, but that unequal irritabilities existed in different diseases. These latter, again, could either establish merely quantitative distinctions, so that a substance reacted more strongly or more weakly upon a patient, which would, however, over-excite another ; or qualitative distinctions might exist where, in one disease, a particular substance had always a warm reaction, in another always cold.

220. To get nearer to the natural laws lying concealed here, the question required to be stated more simply ; it would not do to begin with substances of different kinds, it must be attempted with those identical. I therefore returned to my rock crystal and selenite, in which I might hope to bring to observation, in one and the same example, the different temperatures which appeared to the sensitive to run through all nature, and from this point to carry out the comparisons. With Miss Nowotny, therefore, I took a selenite four inches long with a natural point, and drew it down over the inside of her hand from the wrist to the tip of the middle finger, near the skin, but without touching it,

while she was in the north-south position. She felt a cool wind pass over, as if one had blown on her hand through a straw, as has already been mentioned in § 33. I then reversed the crystal, and took the same course over the hand with the opposite point of the crystal; she now experienced no cold, but a tepid warmth, which was, besides, disagreeable. A rock crystal, rather longer, carried down over the hand in the same way with both ends, gave the same results. Miss Sturmann felt the downward pass over the hand of one pole of a tourmaline, warm; of the other pole, cold. Iceland double spar acted upon her exactly in the same way.

221. Miss Atzmannsdorfer expressed herself in the same way: the above selenite, passed down over her right hand, gave coolness to her with the same end that had given it to Miss Nowotny. When I passed the same point down over her left hand, she felt it still cooler. Reversing the crystal, the pass down the right hand was warm, down the left unpleasantly tepid. I made the same experiment with Miss Reichel. I passed the same selenite over her hands. The same end which had caused coolness to the above different sensitive persons also produced coolness in the downward pass over her right hand; in like manner over the left also cool, but more strongly and more agreeably. When I reversed the crystal, and operated in the same way with the other end, she found the pass down over the right hand scarcely cool, on the left hand warm. She said, when passing downward, it seemed as if something was taken from her; when upwards, as if something was given. Miss Maix expressed herself just in the same manner in similar experiments.*

* This experiment I have made many times, and the striking corroboration afforded by my own experience to this fact is very agreeable; for not only does it afford us a general rule as to the difference between the effects from the two ends of the crystals, but it tends to establish

222. Similar accounts have been given at §§ 33, 34, 35, in regard to M. Schuh and Professor Endlicher. In the meantime many other persons who have experienced the same sensations have given me permission to cite their testimony: M. Theodore Kotschy, Dr. Venzl, M. Voigtländer the optician, Mr. Incledon, M. Studer; the joiner Tischler must also be named among the healthy sensitive. M. Kotschy, as well as Mr. Incledon, could only bear a few repetitions of the pass of the cold end of the large rock crystal from the head down over the body, as they then felt sensibly affected in the stomach, and I was compelled to desist.

223. Generally, therefore, did all the experiments and witnesses agree, *that one pole of the crystals gave a cold, the other a warm pass.* I say expressly, generally, since here and there single persons occur who cannot settle properly about cold and heat, fancying the same passes to feel sometimes cold, sometimes warm, varying between the two feelings in different dispositions, or only becoming certainly clear and consistent as to the quality of the sensation after repeated passes. But there are in all cases healthy or merely slightly indisposed persons; the properly highly sensitive are but seldom in doubt. Novices in the experiments are, in particular, less clear at first. The special cases, however, in which the decision between cold and warmth was variable in them, I shall discuss hereafter, and trace them back to definite clear cases.

234. When a dualism in the crystallized bodies had been substantiated both by these facts and through much of that which was detailed in the second of these treatises, a dualism which follows in an unmistakeable parallelism with that of crystallization itself, the questions arose, what is the nature of this dualism? Does it consist of a duplicate difference of the agencies of either end of the crystal when passed directly or inversely in relation to the brain.

city? Or does it correspond to a real presence and absence? Or is it like a positive and negative opposition? I acknowledge that I can as little give a definite answer to these, as we can find a certain intelligence of cold and heat, of + E and - E, of + M and - M, &c. I was obliged to be content, for the present state of matters, to make certain of a parallelism which I might perhaps hope to discover between Od and crystallization, magnetism and electricity.

225. We know, from what has gone before, that Od has much agreement with magnetism, leaving out of consideration the capacity of the latter to attract iron, to take a direction from the terrestrial magnetism, &c.; in particular, that it affects the sensitive exactly in the same way. When I passed a magnetic needle down over the hands of different highly sensitive persons, they received exactly the same sensations as from a crystal of selenite, calcareous spar, topaz, &c. As a rule, the northward pole, that is, the negative end of the needle, declared itself cool; the southward pole, the opposite positive end of it, warm. When a perfect agreement of certain poles of crystals with certain others of the magnet was thus brought to evidence, a right was acquired to conclude a similarity of cause, and to apply a similar nomenclature to those poles of crystals which exercised effects wholly homologous to determinate poles of the magnet, and were gifted with corresponding fundamental qualities; so that when + M agreed with Od, we could apply the term + Od, and in reverse in the same way — Od.*

226. In order to work this out, I first investigated, more minutely, the relations of the sensitive to the poles of the magnet. I placed a small magnetic rod in the hands of Miss Maix; it was about four times as long as the breadth

* I have repeated these experiments on many impressionable subjects, and can afford a strong corroboration of the facts. In some cases sleep and vigilance result according to the pole offered to the patient.

of her hand. I first made her place both fists close together in the middle of the rod, so that the latter passed through both, the northward pole being turned toward the left side. She experienced a moderate amount of disturbance from this. I then made her advance her two fists along the rod, the left toward the left, till it enclosed the northward pole ; the right toward the right till it enclosed the southward pole, briefly, in such a manner that she had one pole in each fist. The effect of this alteration was very perceptible ; she now experienced a very active disturbance through both arms, the breast, and head. When she removed one hand from the rod, the disturbance ceased suddenly ; it returned and vanished alternately, as she alternately grasped and let go one pole, retaining the other in the other hand. The same occurred when she repeated the operation with the other pole. Therefore, there was a condition like a current, a kind of circuit, as was observed before on the occasion of the contact with both my hands, of which I have already given an account in the third of these treatises, § 86. For the control of this, I repeated it with a large horse-shoe magnet, placing one of her hands upon each pole, the left upon the northward. She immediately became pained and oppressed in the breast, by the circuit which she felt through this from the arms ; the head was involved and soon rendered giddy, and the patient was again reminded of the “ring-game” which she had spoken of in the former case, &c. The moment I let her take one hand away from the magnet, she felt at once the interruption of the circuit, and again breathed freely. Every repetition afforded a similar result. In both experiments, especially the latter, stronger one, it was requisite that the northward pole should lie in the left hand, the southward in the right, for the sensations to be in any degree supportable : when I reversed the poles the patient could not bear it ; she again experienced the strange conflict within her, already described, and evinced so great

internal torment, that I was obliged to give up the experiment immediately. If I venture to assume the existence of a circuit here, like that of the galvanic current, I am obliged to conclude that it here flowed from the positive southward pole, through the right arm and upper part of the body toward the left side, and then through the left arm and hand down to the negative northward pole of the magnet. Then, *the left hand of the patient corresponded to the southward pole, and her right hand to the northward pole of the magnetic needle : in other words, her left would be positive, her right negative, in relation to magnetism in the old unaltered sense of the terms*, and the quality of the left hand would have to be indicated by + Od (here = + biod), and that of the right by — Od (here = — biod).

227. It will be remembered from § 86, that when I had placed my right hand in her left, and my left in her right, a similar circuit was felt by the patient, which she was able to sustain ; but that when I crossed my hands, so that the hands of the same name came together, namely my right in her right, and her left in my left, the often mentioned so-called struggle arose within her, which she could not sustain, since it was insufferably painful to her. From this it follows, that my male hands corresponded perfectly, in qualitative magnetic respects, with the female hands of Miss Maix, that my right took the place of the negative, northward pole, and my left of the positive, southward pole, and therefore they possessed magnetism, with positive and negative properties, in just the same order as those of the patient ; consequently, that *men and women are organized exactly with the same polarity in these points.**

* Dr. Elliotson had a very remarkable case (Adlard) illustrative of this conclusion. When the patient, a male, was in mesmeric sleep, the two sides of the body were so different one to the other that he could not suffer his legs or his arms to be crossed. He could not allow his right hand fingers to touch his left cheek, or his left hand fingers to

228. After I had cleared this up, I placed the magnetic rod in the left hand of Miss Maix, in such a manner that it extended from the tip of the middle finger upwards to beyond the hand, and on to a part of the arm. The northward pole lay above upon the arm, the southward below on the tips of the fingers : thus all remained in its natural arrangement. When I reversed the rod, discomfort commenced ; the so-called struggle began from the wrist to the fingers. I now pushed the magnetic rod up her sleeve, so that it lay upon her fore-arm. When I kept the arrangement such that the northward pole lay above at the elbow and the southward below at the wrist, the patient found its position in accordance with the natural conditions ; when I reversed the rod, the disagreeable contest at once became felt again.

I repeat here the observation which I have already made in an earlier place, and which must not be left out of consideration in the critical examination of these phenomena, that the patient lay in the magnetic meridian ; the head to the north, the feet to the south, and the face looking southward.

229. If, now, as all up to this point has testified, the same force and influence upon the living organism occurs in crystals as in the magnet, a simple crystal brought into the same circumstances as the magnetic rod ought to produce the same results. I placed a crystal of selenite between the two hands of the patient. It soon appeared, however, that it was anything rather than indifferent how it lay between the tips of the fingers of the two opposite hands. First, she soon felt out that the two most distant points of the rhombohedron were indeed part of an internal force of the crystal, but not the strongest, for there were two others in

touch his right cheek. In either case he started as if he were burned. He could not endure the Doctor's right hand to touch his left side, or the contrary.—See *Zoist*, vol. iii., page 53 ; where some other particulars of this young man's case will be found.

the direction of the short diagonal, which were much stronger, and coincided with the polar main axes. Neither were the poles of their axes alike, for she found one distinctly warmer, the other cooler, just as the patients had always found. When she now held the crystals between her two middle fingers, so that the cool pole lay on the left middle finger and the warm on the right, the condition of matters was in certain respects accordant; but when I reversed the crystal the often-mentioned discomfort appeared. The cool pole of the crystal, therefore, corresponded to the northward pole of the magnet; the warm to the southward. When I placed the crystal in the patient's left hand, short as it was, for the main axis only measured four inches, it was by no means indifferent to her in what direction the axis lay. If the cool pole was directed upward toward the wrist, the warmer toward the fingers, the patient found it pleasant, but if I reversed the direction of the poles, the disturbance of the internal conflict commenced, even though over a small extent. Similar experiments with granite, staurolite, and heavy spar, furnished exactly the same results.

230. I should scarcely have ventured to lay so much weight upon these observations if I had made them upon Miss Maix alone. It might have been a peculiar, perhaps variable, result of disease. But I always obtained exactly the same effect in repetitions of it in very different conditions of disease. When I extended to Miss Nowotny, already far advanced in convalescence, one of my hands, she felt each singly, in exactly the same way as Miss Maix; and when I gave her both hands, she felt herself subjected, in like manner, to the sensation of a circuit, which she could not long sustain. Miss Atzmannsdorfer found my right hand warmish in her left, my left hot in her left; when I gave her both hands, she at once felt the circuit, which affected her whole body, and rendered her head giddy. But when I extended my crossed hands to her, I was not very

successful, for the effect was so violent, that she began to lose consciousness, even in a few seconds, and I was obliged to pause. With Miss Reichel my right hand was never disagreeable in her left, but my right was painfully unpleasant in her right. She felt the two oppositely corresponding hands through the whole arms, and soon in the head, but not nearly so strongly and insupportably disagreeable as when I grasped her crossed hands. All this is in perfect agreement with what I have circumstantially detailed of Miss Maix.

231. Thus the law is evolved, that determinate poles of crystals and of living organized structures correspond to the poles of the magnet in relation to Od, that *crystals have in this sense a clearly displayed north and south pole; that the cooler always corresponds to the north pole of the magnet, the warmer to its south pole, and finally that, of the human hands, the right corresponds in kind to the northward pole, the left to the southward, both in the male and female sex.* Therefore + Od (here + crystalloid, or + bioid) presents itself equivalent to + M, and - M parallel to - Od, &c.

232. For the further confirmation of the facts here unfolded, I will include in my report some other similar conditions, which have presented themselves in healthy persons, in particular in M. Carl Schuh, the private physicist. A man of healthy, powerful aspect, thirty years of age, and of vividly sensitive temperament, he exhibited far more excitability by Od, than many other persons, so that he thus constituted a certain medium between unsensitive healthy persons and excitable nervous patients. He had hardly ever been ill, but when he over-applied himself to his labours, he sometimes suffered for some hours from headache. He vividly experienced the influence of all crystals; large magnets affected him distinctly, even at the distance of a yard. When I placed my right hand in his left, he felt a disagreeable effect, in a few minutes, in his head; and when I took his

right hand with my left, the disorder increased rapidly ; it rose in a few minutes from the temples towards the brows, and in half a minute produced a throbbing headache, which soon became almost insupportable, and remained for almost eight minutes after I had set his hands free, disappearing gradually and slowly ; when I crossed my hands with him, as I had done with the highly sensitive, he found it exceedingly unpleasant. Starting from the later observations, namely, that the right and the left stand, in the relation to one another, of negative and positive, I proposed to him to use his own right and left hands instead of mine, and to place his hands one within the other, without the interposition of mine. To the no small astonishment of himself and the rest of the company, he found that his headache came on immediately and just as strongly as when I had given him my two hands ; that it remitted and gradually disappeared when he separated his hands, but, every time, returned directly he folded them together again. His negative right on his positive left formed a kind of "element," if I may borrow this expression from galvanism; the arc was completed by the arms and body, and the polarization, or, if the word may be admitted for once *in subsidium*, the circuit commenced, and then acted upon the brain. Several months later, when we again came to speak on the subject, he told me that at no time does he dare to leave the hands together : since he has known the effects, the commencement of the disturbance at once reminds him to separate his hands whenever he accidentally brings them together. Other healthy sensitive persons exhibited wholly similar results. M. Kotschy at once felt affected by my hands, and when I reached him both, he described the effect as a kind of circuit, which flowed from and to me, through the arms and chest. When I gave the two hands crossed, he represented his sensations as annoying painful shocks in the arms and head, almost in the same words as Miss Maix. But

M. Kotschy never suffered from headache. Mr. Incledon received a quite unbearable headache from my two hands; especially, however, when they were given to him crossed.

233. We are now in a position to cast a retrospective glance over the most striking phenomena in all the sensitive; namely, that when lying on the back in bed, or in a similar position on a seat, they were of all directions least able to bear the west-easterly position. This is the position with the head to the west and the feet to the east, the face turned towards the east. In this position, the whole right side is turned towards the south, while the entire left is directed to the north; or in other words, the positive side of their bodies is turned towards the positive pole of the earth, and their negative to the negative. Equivalent, therefore hostile poles, are turned directly towards each other, and since these mutually repel each other, it becomes to some extent comprehensible why such a position must become so exceedingly injurious to the patients so highly sensitive in these points. In July, when Miss Nowotny endeavoured to go out again, she was utterly unable, even out of doors, to bear a walk from the west towards the east. It would be impossible to find more perfect confirmation of my preceding observations; and M. Schuh is no bedridden and obscure patient, but an active man known and seen by half Vienna and half Berlin.

234. I undertook a thorough control of the law obtained with Miss Reichel. It is known from the preceding treatise that I possessed series of simple substances and preparations, prepared by Miss Nowotny and Miss Maix, arranged by them according to the degree of discomfort they experienced from them. But in their graduated series, although they ran by regular degrees from the electro-chemically strongest substances to the weakest, no regard at all was had to their negative or positive relation in the electro-chemical series; only the quantity of their effect upon the sensitive had been

that downward warm, that upward cool. Lastly, I became acquainted with Miss Maria Atzmannsdorfer, and found in her a *sensitive* subject,* who felt the pass of the

* I borrow the term "sensitive," for magneto-physiological reaction, from vegetable physiology, in which plants of definite irritability—such

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taken note of, and not their quality. If, then, as had every appearance, the distinction between cold and warmth, in the feelings of the sensitive, be founded upon a distinction between negative and positive, in the same way as between the poles of magnets and of crystals, the above-mingled series should be capable of being divided into two halves, according to their difference of cold and warmth by those who felt this, one of which halves should comprise the negative, the other the positive substances. In this experiment I used the series of substances Miss Maix had formed as a basis, and made Miss Reichel bring this into two groups, according to cold and heat. I here give the result. The series proceeds from the greatest strength down to the least. The numbers denote the order in which they were originally placed in Miss Maix's series, before it had been divided into two by Miss Reichel.

WARM.	COLD.
2. Potassium.	1. Oxygen gas.
3. Caffeine.	4. Sulphuric acid.
5. Purple of Cassius.	6. Iodide of gold.
7. Brucia.	8. Diamond.
15. Chromic acid.	9. Chloride of gold.
19. Picarnarate of lime.	10. Sulphur.
21. Bromide of silver.	11. Bromine.
22. Iodide of silver.	12. Tellurium.
23. Iodide of bismuth.	13. Osmic acid.
26. Picamar.	14. Selenite.
27. Atropine.	16. Lunar caustie.
28. Acroleine.	17. Orpiment.
31. Rhodium.	18. Chloride of mercury.
32. Narcotine.	20. Oxide of platinum.
35. Strychnine.	24. Iodide of carbon.
37. Sesqui-oxide of lead.	25. Iodide of mercury.
38. Alloxan.	29. Iodine.
40. Picrotoxine.	30. Telluric acid.
41. Ultramarine.	33. Cyanide of mercury.
43. Mesite.	34. Selenium.
46. Citronyle.	36. Paracyanogen.

WARM.

47. Draconine.
48. Bismuth.
52. Creasote.
53. Potass.
57. Lithium.
58. Cantharadine.
61. Cetine.
64. Æsculine.
66. Baryta.
70. Melamine.
74. Grey pig iron.
75. Murexide.
76. Protoxide of manganese.
78. Hydrate of oil of turpentine.
79. Cholesterine.
80. Asparagine.
82. Hyoscyamine.
85. Alloxantine.
88. Caryophylline.
89. Allantaine.
90. Sulphuret of ammonia.
91. Lime.
94. Gold.
97. Zinc.
98. Stearine.
99. Chromium.
101. Osmium.
104. Palladium.
107. Mercury.
108. Delphinine.
109. Daturine.
110. Lead.
113. Oleic acid.
116. Cadmium.
117. Sodium.
118. Antimony.
121. Red lead.
124. Morphia.
125. Benzamide.
126. Veratrina.
127. Indigo blue.

COLD.

39. Prussic acid.
42. Sulphuret of potassium.
44. Arsenic.
45. Oxide of mercury.
49. Iodide of lead.
50. Chloride of cyanogen.
51. Chloride of lime.
54. Oxide of copper.
55. Cyanide of potassium.
56. Sulphuret of calcium.
59. Sulphate of morphia.
60. Bromide of potassium.
62. Cyanic acid.
63. Antimonic acid.
65. Sulphuret of cyanogen.
67. Hydrate of baryta.
68. Parabanic acid.
69. Borax.
71. Acetate of morphia.
72. Hydrochlorate of citronyle.
73. Phosphuret of nitrogen.
77. Oxide of cobalt.
81. Titanic acid.
83. Uric acid.
84. Neutral phosphate of lime.
86. Chloride of carbon.
87. Carbazotic acid.
92. Phosphorus.
93. Bichromate of potass.
95. Oxide of nickel.
96. Alcohol.
100. Chloride of chromium.
102. Albumen.
103. Ammoniochloride of platinum.
105. Protoxide of chromium.
106. Black lead.
111. Oxide of silver.
112. Common salt.
114. Molybdic acid.
115. Iodide of potassium.
119. Sulphate of iron.

WARM.

- 129. Titanium.
- 132. Naphthaline.
- 133. Coal wax.
- 137. Nickel.
- 138. Copper.
- 139. Santonine.
- 140. Iridium.
- 141. Tin.
- 142. Cobalt.
- 148. Amygdaline.
- 149. Mellone.
- 150. Quinine.
- 151. Piperine.
- 156. Benzoyle.
- 157. Urea.
- 158. Platinum.
- 159. Silver.
- 163. Eupion.
- 167. Bar-iron.
- 171. Paraffine.

COLD.

- 120. Nitric acid.
- 122. Oxide of manganese.
- 123. Sebacic acid.
- 128. Stearic acid.
- 130. Massicot.
- 131. Oxamide.
- 134. Cinchonine.
- 135. Melan.
- 136. Hippuric acid.
- 143. Fumaric acid.
- 144. Malic acid.
- 145. Benzoic acid.
- 146. Lactic acid.
- 147. Cinnamonic acid.
- 152. Peroxide of lead.
- 153. Gallic acid.
- 154. Tannic acid.
- 155. Succinic acid.
- 160. Spring water.
- 161. Mannite.
- 162. Charcoal.
- 164. Starch.
- 165. Gum.
- 166. Sugar.
- 168. Vinegar.
- 169. Sugar of milk.
- 170. Citric acid.
- 172. Distilled water.

235. When this arrangement is examined, it is seen that almost all metals, potassium at the head, with the isolated exceptions of tellurium and arsenic, are on the side of the warm bodies,—therefore, on the especially negative: we find, further, under this head, almost all organic substances, and organic bases; the compounds of carbon, rich in hydrogen, and barely a couple of acids, chromic and oleic. On the other hand, we observe in the opposite, cold side, all bodies like sulphur, bromine, iodine, selenium, all compounds of chlorine, the oxides of the metals, all compounds of cyano-

gen, and almost the whole of the acids. So far as we can judge of the substances, we perceive on the warm side scarcely anything but electro-positive—on the cold side, scarcely anything but electro-negative. It is certainly surprising, and in the highest degree worthy of notice, that a human being—a girl perfectly ignorant of such things—is capable of classifying with certainty and accuracy, according to one of their innermost, profoundest, and most obscure peculiarities—their electro-chemical character, all the substances of this world, without seeing them, and by mere dull sensation.

236. As we have been compelled to infer of the magnet, crystals, and human hands, *all warmth-giving substances are positive*, so are we now obliged to conclude that *all positive bodies give out heat*. This holds good in the reversed formula of the negative, and thus we arrive, in a different way from that already known, at the electro-chemical series of bodies, which, from this point of view, we may call the Od-chemical series.

237. As to the manner and circumstances by which I obtained this result, I may add, that I gave the observer all the bodies which consisted of solid substance, into her bare left hand ; the pulverulent on a fine, very thin tissue paper, which did not require to be taken into account ; and the fluid in the bottles in which I usually kept them. I did not neglect to control this operation repeatedly, and most minutely, by making the same trials over again, in modified ways. At one time I placed all the bodies at one end of a long and wide glass tube, while Miss Reichel grasped the other in her whole hand. When I inserted one body after another into the tube, the feeling of warmth and cold changed in a moment. Another time, I selected a glass rod of such condition that it was not felt either warm or cold. With this I let her touch the substance, inserting it into the powders and fluids, and placing it against the side of the solids. With this kind of feeler she very accurately

distinguished the warm or cold condition of bodies every time; and I can, from experience, especially recommend this mode of testing, as readily provided for, everywhere applicable, and very clear to the observer. By means of two such rods of equal thickness very accurate comparisons between two different bodies could be made. The examination of bodies, by placing them, together with the bottles in which they are contained, in the hands of the patients, is only possible with substances of great strength; as with sulphuric acid, potass, caffeine, &c. In the weaker, it is inadmissible, because the glass itself has very different properties, feeling, according to its chemical condition of admixture, sometimes warm, sometimes cold, and sometimes indifferent, and thus readily rendering the result incorrect. This frequently goes so far, that weak substances, which by themselves feel cool, are thereby made to feel warm, and *vice versa*; and then errors will be produced. Salts and other preparations, which occur in a crystalline condition, must be powdered before testing, even if only coarsely. For, since the crystals are polar, no pure result of quantity can be obtained from a group, as isolated crystals affect the result by their poles, and render it complex. I hesitated a long time, for instance, with saltpetre and bichromate of potass, between warm and cold, until I powdered them, when a constant coolness presented itself. And when a substance is powdered, it must not be examined immediately, but after some hours. For, the mortar and pestle in which it has been powdered influence it for a long time, through transference: in like manner, the rubbing in the trituration alters the natural odic value, since it brings in accumulation from friction, perhaps also from electricity, that may be thereby set in motion. Finally, the substances to be examined must not be allowed to remain previously for any time near other, especially much stronger or much weaker ones, because they will, in that case, become altered

by transference ; moreover, they must not have stood in the sunshine, nor in the moon's rays ; they must not have remained long in the hand ; when several are to be compared together they must be tolerably equal in temperature, &c. All these things would interfere with the purity of the result, as is abundantly evident from the preceding treatise.

238. I need scarcely observe that the series which I have above given is not to serve as the normal, but only as an example, and as a help to the argument. For to have been laid down as the type, it would have required the previous most accurate investigation of the chemical purity of the substances, a labour for which neither time nor circumstances have yet afforded sufficient opportunity. I merely intended to seek out and lay down the law ; its accurate application will belong to another time. Countless other preliminary investigations are also requisite here, the infinity of which I fully feel and recognize ; in the first place of all, these testings of positive and negative character of bodies, which I was here first able to carry through with Miss Reichel, must be undertaken with several other sensitive persons in different conditions ; thereby must be found the key to the distinction of their sensations, as also the results of more exalted or lower excitability, in comparison with Miss Reichel, who, since her sensations coincided so accurately with the general electric condition of bodies, as it has been made out previously in other ways by physics and chemistry, must have been in a remarkable equilibrium,—one might say, of purity of diseased condition.

239. We will now make some applications of the discovered law, that substances which affect the sensitive as warm or cool, the thus od-positive or od-negative, correspond to the electro-positive and electro-negative. First of all, we found the sun strikingly cool, but the moon strongly warm on the sensitive ; the fixed stars ranged themselves with the sun, the planets with the moon. I do not know whether

astronomers have yet made out anything positive on this subject ; so far as my knowledge goes, nothing has been made known on this point, except what M. Kreil* traced into the qualities of the moon, from the interference with the declination of the magnetic needle. It is then certainly in some degree interesting, that the human feelings should be able to carry us so far as to recognize that the fixed stars take their place all on the electro-negative, the moon and the planets on the electro-positive side : luminous and illuminated stars are thus opposed in a polar manner to each other. Perhaps we shall one day succeed, if not in deciding, yet in raising a probability, that a comet which only sends us polarized light is actually a reflecting and not an illuminating body. Subjecting this to rigid criticism, it may indeed be objected that the feelings do not necessarily point here to the electro-chemical condition of the heavenly bodies, but only the influence of their emanations ; their rays of light, of heat, &c. are perceived in the feelings of the patient. I do not at all oppose this ; at the same time, all that we have yet succeeded in discovering about the heavenly bodies is perceived through emanations of each kind, by means of our senscs ; all that we know of them relates to that alone which arrives to us through their emissions, and thus we are in the same position with the odic emanations, which tell us that the sun is od-negative, and the moon od-positive, as the emanations of light teach us that the sun is warm, the moon almost without heat, &c.

240. From § 147, in the examination of the chemical activity, we already know that all fire effects the feelings of the sensitive with cold. This is so far worthy of regard, that we know from the researches of Pouillet (*Annal. de Phys. et de Chim.*, tom. xxxv., p. 402), that the exterior of flames, which depend upon oxygen combinations, possesses

* *Astron. meteorol. Jahrbuch.* 1842.

much free positive electricity. This cold is not only diffused from the free fire of od-positive or od-negative bodies,—as from potassium, stearine, oil, alcohol, and sulphur, but it may also be detected when the fire is inclosed, whether it be in positive or negative bodies. For when Miss Reichel approached a stove warmed by the fire inclosed in it, she found it indeed warm at the greatest proximity, so long as its real heat acted in a preponderating degree upon her, especially with iron stoves; but when she drew back, scarcely a couple of steps, it caused her vivid sensations of coolness, and the stronger the more actively the fire burnt in the stove. When she was chilled in the winter time, and went to warm herself at the heated iron, it now chilled her through and through, and her fingers, which previously were rather stiff, became perfectly so; she was compelled to go away, and endeavour to warm herself by walking up and down the room and rubbing her hands. It was pretty nearly the same thing whether the stove was of earthenware or of iron. In judging this strange effect, it must not be overlooked what a complex phenomenon this is of what is given out by heat, light, chemism, the electricity thereby excited, the substance of the burning materials, and, finally, of the stove itself. The resultant, however, of all these components is, in all the cases hitherto observed, an uncommon degree of cold to a distance of many paces, so that it drove Miss Maix out of the illuminated churches, § 131, and Miss Reichel, when she remained only a short time in the vicinity of a burning wood fire, was in rapid succession first attacked in the head, then rendered giddy, and at last felt so seized with pain in the stomach that unless she hurried away she fainted. *Fire, therefore, acts od-negatively on the sensitive in all cases.*

241. The question suggests itself here, what apparent temperature may be shown by flames of that kind which the Od itself produces, and which, invisible to healthy persons,

are perceived by the sensitive on the polar ends of wires from all the various sources of Od. To solve this I inserted first a glass rod, which itself felt cool, and an iron one, which felt warm, in a number of substances, and let Miss Reichel feel the flames issuing from the extremities at a distance of two inches. I obtained the following series, exactly similar, from the glass and iron rods :—

COLD OD-FLAMES.	WARM OD-FLAMES.
Bichromate of potass.	Gold.
Sugar.	Platinum.
Sugar of milk.	Potass.
Citric acid.	Narcotine.
Oxalic acid.	Minium.
Chloride of lime.	Oxide of lead.
Sulphur.	Cast iron.
Bromine.	Paraffine.
Graphite.	Mercury.
Charcoal.	Tin.
Arsenic.	Cadmium.
Manganese.	Iridium.
Alcohol.	Creosote.
Sulphate of iron.	Iron filings.

The apparent temperature of the flames agreed accurately, therefore, with the temperature which the substances, on which they depended, had shown, by feeling in immediate contact, by feeling through a long glass-tube, and with a glass rod : *all od-negative substances give cold, all od-positive warm flames. The temperature of the flames, therefore, affords an expression of the odic quality of bodies in general.*

242. This sensitive patient also felt all radiations from electrified bodies cold, especially those positively electrified. The conductor, glasses, and wood-work, all gave heat by themselves ; as soon as I electrified them, and only to a strength capable of yielding positive sparks one-fifth of an inch long, and in the moist air of cloudy weather, she felt all these

substances perfectly cold at distances of from ten to fifteen paces. This feeling of cold increased rapidly, the faster I turned the plate of the machine, yet was not immediate, but always became first perceptible several seconds later than the electric charge upon the bodies. A fox-skin, by itself warm, gave great cold, when I had beaten an electrophorus cake with it. The same occurred when I let the electricity flow from the conductor into the air through points, instead of electrifying bodies with extended surface.

When, on the other hand, I placed negatively electrified bodies opposite the observer, she found them warm; an electrophorus composed of pure resin, warm by itself, emitted far greater heat after it had been beaten with the fox-skin, and became observably warmer with almost every stroke, up to a certain degree, where it remained stationary.

After these observations the conclusion was warranted, that positively electrified bodies produced cold, negatively electrified warm sensations. Since this ran counter to the general ascertained theory, the cause of such effect must be derived from the electrical distribution, whereby the air, surrounding the positively electrified bodies in which the observer was placed, was negative by distribution, and consequently as the nearest substance must act negatively upon her sensations,—that is, in opposition to the condition of the electrified body.

243. A great number of experiments were made with the voltaic battery, and this would be the proper place to give an account of the temperature of the odic flames produced by it; but, as the results, on this point, appear too complicated to admit of dismissal with a passing notice, I must reserve the regular description of them for a special treatise.

244. The odic flames which were produced by candle-light, as by sun-light at the end of long wires, all felt cold.

Miss Reichel felt the coolness of the odic-flames issuing from the further end of a long wire, twenty yards long, which was attached to a copper plate, illuminated by eight candles. Here, indeed, both heat and chemical action influenced. Sunlight, directed upon a large plate of iron, and thence turned towards her with the point of a wire, gave a flame of which the coolness reached very far; moonlight, on the contrary, thrown upon the same plate, produced heat in the flame at the point of the wire directed toward the observer; and this, always alike in many repetitions, at very different times.

245. The following experiment, similar to those in §§ 122 and 123, may indicate the condition of the Od produced by heat. With Miss Maix, I had an earthen pot filled with cold water, inserted a wire ten feet long into it, placed the other end in her hand, put a cover over the water, and allowed the patient to become accustomed to this arrangement. I then poured the cold out, and replaced it with boiling water. She at once felt the wire increase in apparent heat,—that is, in odic heat; this acquired a steady maximum in a few seconds. I now threw some pieces of ice into the boiling-hot water: the heat of the wire in the hand immediately began to decrease; it sank continually till it wholly disappeared, and now the temperature was reversed. The disagreeable heat of the wire vanished entirely, and in its place appeared the beginning of a coolness, which continually increased, and soon became very pleasant to the observer, affecting the hand, then by degrees the arm, and so on, the whole person, even to the back. Judging from this, I must assume that the warming produced positive, the cooling negative, movements of Od in the bodies.

246. Rubbing a copper plate with a piece of wood gave warm + od in the copper wire seven yards long, § 125.

247. The chemical polarization is usually decided by the

predominant constituent, which enters into the compound, and in neutral combinations, by specific quality and position of these in the od-chemical series. A number of experiments, relating to this, have already been described in the fifth treatise, from §§ 137, 139—142. I will add a few other instances here. I placed iron-filings in a glass cup, and poured some water on them. A glass rod inserted in this felt rather warm. I poured some vinegar in, and the rod at once gave cold. Vinegar, like almost all vegetable acids, is od-negative. But the rod soon became warm again ; the vinegar had been neutralized by the iron, and a great excess of iron-filings remained. I then added citric acid : the same course was followed : in particular, after I had stirred up the mixture a little, the rod became wholly warm again. I next took, *seriatim*, a few other organic acids ; all produced the same effect. In another experiment, I used strong solution of potass, as base, which, being od-positive, made the glass rod warm ; sulphuric acid poured into this rendered it cold for a moment, then followed great heat, the alkali remaining in excess. Sulphuric acid added, to neutralization, produced warmth for some moments during the combination, but permanent cold followed ; sulphate of potass, like all sulphuric acid salts, is an od-negative body. Effloresced carbonate of soda, placed in water, evinced at once an uncommon degree of cold ; the imbibition of water of crystallization, in the place of that lost by efflorescence, was, therefore, an act expressing itself externally as negative. By stirring this, cold was increased for a short time, then it was moderated ; carbonate of soda is itself od-negative. Addition of strong diluted sulphuric acid did not act upon the thermometer standing in the fluid, but the glass rod, nevertheless, became very warm during the evolution of carbonic acid : as soon as the effervescence ceased, it again became cold. Sulphate of soda is od-negative, but in the driving out and gasification of the carbonic acid,

positive Od was necessarily set free. The observer often said that she felt the sensations like shocks during the decompositions ; as the bubbles were formed, she fancied she felt reflex effect in the glass rod. We shall hereafter return to similar phenomena ; for in these matters, there is nowhere effect without cause.

All chemical action, therefore, moves in manifold alternations of + and — od, dependent on the position of the substances entering into it, in the odic series ; so that the result may always be predicted so soon as the relative value and quantity of these are known.

248. We now come to the examination of living organic structures : in the first place, of plants. I brought to Miss Maix some flower-pots, containing a *Calla Aethiopica*, a *Pelargonium moschatum*, and an *Aloë depressa*. I rolled up one end of a long stout wire into several coils, and gave the other end into the hands of the patient, to allow her to get accustomed to it. I then laid the coils over the plants, so that these were surrounded and involved in them. An unexpected vivid effect displayed itself. The wire immediately became hot in the observer's hand, and this so much that it ran up the whole arm. At the same time, the point of the wire diffused cool wind. The Calla manifested the greatest strength, the Aloë the least ; so that it seemed likely that the measure of the strength increases, in equal degrees, with the rapidity of growth of the plant. The quick growing Calla showed itself incomparably more active than the slow Aloë, in spite of its greater mass ; while the Pelargonium moschatum always kept the medium. Perhaps the observation is not out of place here, that the Calla belongs to the family of the Aroideæ, in which it is well known that the strongest evolutions of heat, therefore especial manifestations of intense vital activity, occur.

249. In the end of September, I walked in the fields with Miss Reichel. We noticed all the flowering plants

we met with. Entire trees produced a total impression of coolness ; single plants in pots, the same, collectively ; in particular, however, she found most of them warm on the stem, but the flowers cool : e. g., in *Gentiana ciliata*, *Inula salicina*, *Euphrasia officinalis*, *Odontitis lutea*, *Orobanche cruenta*, *Linum flavum*, *Hordeum distichum*, *Coronilla varia*, *Rosa Bengalensis*, *Pelargonium roseum*, *Iberis*, *Impatiens*, *Alchemilla*, *Campanula*, *Daucus*, &c. Trees were also cold at the upper end, and warm near the ground : e. g., *Pinus picea*, *Abies nigricans*, *Fraxinus excelsior*, *Hippophaë rhamnoides*, *Laurus nobilis*, *Punica granatum*, *Quercus austriaca*, *Betula alba*, *Morus morettiana*, *Salisburia biloba*, *Hedera quinquefolia*, *Cassia corymbosa*, *Juglans regia*, &c. Among the Compositæ, she found the ray-flowers of many cool, those of the disk warm,—e. g., *Picris hieracioides*, *Centaurea paniculata*, *Aster sinensis*, *Amellus*, *Dahlia purpurea*, *Senecio elegans*, *Coreopsis bicolor*, *Asterocephalus ochroleucus*, *Scabiosa columbaria* and *atropurpurea*, &c. Some were cool in the stem the inflorescence warm ; as *Plantago lanceolata* and *Salvia verticillata* ; she experienced a mixture of cold and heat from families of *Clematis vitalba*, and the capsules of *Papaver somniferum* where, indeed, she may have felt through the alkaloids and oil of the seed. It results from this, that *different parts of different plants behave differently in relation to Od.*

250. To come closer to the facts, I pulled up a large turnip, and made Miss Reichel examine it. She found the fibrils of the root od-positive, but the tuber od-negative below, and od-positive above ; the whole head of the thickened tap-root, especially the neck, where the buds and leaves are produced, very warm ; all the leaves warm at the base, slightly warm at the points, but above the middle zone, where they are most widely expanded, very cold. A plant of *Heracleum sphondylium*, as high as a man, had the root warm, the stem, up to immediately below the

umbel, warm, round the involucre still warmer, the umbel itself cold. A ripe cucumber and a melon were found cool above, on the remains of the flower, but cold below at the point of attachment to the stem.

251. Hence it followed, that no universal polarization in regard to Od, according in any way with *Caudex ascendens* and *descendens*, somewhat as in crystals, occurs in plants, but that positive and negative conditions alternate at different points : however, *internodes of the same name, and within these, again, parts of the same name, possessed like odic disposition* : I therefore turned to the investigation of the single organs. First, with Miss Maix, on a young *Aloë depressa*. She found the point of the main axis strongest ; on the other hand, in detail, the larger, lower leaves acting more strongly,—that is, diffusing more cold wind than the smaller upper ones ; stronger in the axils than at the points ; the mid-ribs, with their vascular bundles, stronger than the rest of the parenchymatous mass ; lastly, the under surface of the leaves stronger than the upper. The same plant, as well as an *Agave Americana*, when gone through with Miss Reichel, gave the same results : the little stem cooler at the apex, than at the base ; each leaf stronger at the base and on the under face, than at the point and upper face, and the mid-rib stronger than the borders and parenchyma. The two plants were of about equal size, and bore from ten to twelve leaves. A leaf of *Ulmus campestris*, of *Laurus nobilis*, and of *Punica granatum*, all still upon the tree, were each warmer on the under face than on the upper ; and again, warmer at the point of attachment than at the tip. Leaves of *Castanea vesca*, taken from the tree, were compared in three different stages of growths,—when green, when become yellow, and when wintery brown ; in all of which conditions they could be obtained in October. The green and yellow acted in general as cooling to the hands of the sensitive,—the green stronger, the yellow weaker, the

brown not at all, and behaved, like a sheet of paper, almost indifferently, with a slight indication of tepid warmth.

252. The general results of the experiments on vegetation, so far as they have been thus made in a preliminary manner, would, therefore, allow of our summing them up as follows:—The root-fibres are warm, therefore od-positive; the ends of the leaves, above, are cold, therefore od-negative. The point of the stem loses itself in leaves and leaf-buds; it therefore comes to the negative side. We may say, then, with some grounds, *positive Od predominates in the descending axis; negative Od in the ascending.* This must, however, be accepted with great limitation; for innumerable individual conditions prevailed within these principal states, an infinitely distributed duplicity, in which + and — od alternate a thousand times. The rule peeped forth, however, here, that *where nature is least busy,—where the growing activity is slackened, negativity prevails,—where propulsion shows itself, positivity.* Thus the vascular bundles in the mid-ribs, the under face of the leaves, and the lower part of the leaves toward the point of attachment, were always found more positive; while the more parenchymatous mass, the upper face of the leaves, and the part toward the tip, were constantly more negative. Physiology teaches us that the leaf does not grow principally at the point, but toward the point of attachment, that the apex is perfect very soon after it emerges from the bud; while at the stem end,—that is, the lower half,—the leaf continues to grow for a long time.* The vegetative propulsion, therefore, soon ceases in front, but remains active behind. Here, then, it appears that it is in league with positivity of the imponderables, light, heat, and Od, that creative nature erects her structure; and when she gives up

* Endlicher and Unger, *Grundz. der Botanik*, § 330.—Schleiden, *Grundz. der wiss. Botanik*, tom. ii. 167.

the field to negativity, she carries away life with her in her retreat.

253. We have still to direct our view to the animal kingdom. How immeasurably great the part is which Od here plays, is best shewn us by the profound and enigmatical phenomena of somnambulism. The question, however, here, is not of this, but of certain reactions of healthy life upon the sensitive. When I placed a living animal upon a copper plate, connected by a copper wire several yards long, with Miss Maix's hand, though it was very small—for instance, a rose-beetle (*Cetonia aurata*) or a moth (*Bombyx mori*), or any similar creature,—I was astonished to perceive that she instantly recognized this, after a few seconds, by the apparent temperature of the wire, whether she saw it or not. When I placed a larger animal on it, such as a cat, she felt it very vividly. The effect of my own hand, when I placed it upon the plate, spread all over this, as has been already detailed in other places. I have examined the reactions countless times, in hundreds of modifications ; they gave the always a constant result, that every living creature at once propagates an influence, not only immediately, but even meditately, through various kinds of bodies and long wires, which Miss Maix found as warmth, diffusing at the same time a cool wind, like all the od-diffusing objects of inorganic nature. When I removed the animals, the effect soon ceased, and the wire sank back to its natural peculiar temperature. I made similar experiments with beetles, moths, and cats, on Miss Reichel, which confirmed the preceding in all their results.

254. When I elevated my hands towards Miss Reichel, she felt, even at a distance, warmth flow to her from my left, and coolness from my right hand, as from a distant magnet. Miss Atzmannsdorfer felt the same still more strongly. When I approached Miss Reichel sideways, so that I only turned my right side to her, she felt coolness from me as soon as I

came in at the door of the room ; when I came forward with my left side, she felt me warm. Not only the hands, but the whole sides of human beings, are, left od-positive, right od-negative. Next to the hands, she found the head especially strongly odic, on the right side negative, on the left positive. The toes were in the same way greatly strengthened. With regard to front and back, the front of the head was always found cooler, the back of the head warmer down towards the neck. In the arms and hand, both she and Misses Maix and Nowotny found the following arrangement. The tips of the fingers were the strongest ; then followed those parts of the hands where the fingers arise ; then the tendinous part, at the wrist, *i. e.* where the hand is attached inside to the fore arm ; lastly, the parts of the inside of the upper arm, to which the fore-arm joins. In the fingers themselves, again, there were places of different amounts of sensibility ; but in all places where a finger-joint ended downwards, it lay inside. Nature, therefore, evidently proceeds according to the following rule here. From the shoulder to the tips of the fingers, *the point of greatest irritability, in every joint, always lies on the inside at the distal end of the joint.* There are, consequently, six places from the shoulder to the fore arm increasing in sensibility downwards ; the lower end of the upper arm, of the fore arm, of the hand, of the joints of the fingers, always lying in the inside : on the outside there is no especially sensitive point.

255. The mouth, with the tongue, is a point of very peculiar strength. It is very cool ; that is, od-negative. The sensitive feel all that they touch with the mouth with especial distinctness and strength in reference to its odic value ; on the other hand, the mouth of the healthy is a point from which all objects can be charged more strongly, odically, than with the hands. When I held a glass tube, a metallic tube, a silver spoon, a wooden stick, &c., in my mouth, and

let the various sensitives feel the other end ; they all found them very strongly odified. When I put a glass of water to my mouth, as if I had intended to drink, and then after a short time gave it to the sensitive patient, she took it for magnetized water. When I passed my mouth, closed and without breathing, along the German-silver conductor, without touching it, keeping my mouth only about a minute very close to it, and then allowed Misses Maix, Reichel, Atzmannsdorfer, or Sturmann to grasp it, they found it as perfectly charged as if it had been in contact with a magnet, the sun's rays, the point of a crystal, or my hands.

We here arrive at a not uninteresting explanation of a hitherto obscure matter—*the import of the kiss*. The lips form one of the foci of the biōd, and the flames which our poets describe, do actually blaze there. This will be clearly elucidated in the next treatise.

It may be asked, how this can agree with the circumstance that the mouth is od-negative? This, however, does harmonize very well with the fact ; for the kiss gives nothing, it desires and strives merely, it sucks in and sips, and while it revels, longing and desire increase. The kiss is therefore not a negation, but a physical and moral negativity.

256. As the Od is unequally distributed *in space* over the human body, so also, I concluded, will it deport itself *in time*. I conjectured from many reasons, that the Od might change its distribution, and displace its relative intensities, in the different bodily and mental conditions which we pass through in the twenty-four hours. If such a guess should prove, from experiment, to be well grounded, I hoped we might gain highly interesting hints, even if not explanation, of sleep, digestion, hunger, growing hot, chilling, the mental changes in their physical effects, and so on as to the questions bordering on physics. And if, in the first instance only, inconsiderable data could be discovered in this way, it would certainly indicate to us a new and promising direction

for the investigation of things which are, in all respects, so difficult to throw light upon. With this view, I commenced by letting Miss Reichel make hourly observations on myself, and representing these by graphic lines, in which the times were expressed by the abscisses, and the strength of the Od by the ordinates. I completed the investigations on myself, on my daughter H., and on Miss Reichel herself. A period occurred to the last, in which she remained perfectly sleepless for three weeks, and I availed myself of this time for carrying on the testings, through the night, without interruption. They were arranged in this way: my right hand was grasped by the sensitive every hour, and tested for its strength at that time, measured, and then the point marked upon the table, which proportionately corresponded to the condition of force found. This was continued for twelve, eighteen, to twenty-six hours, in various experiments. My usual habit of life during this was, to wake at from 6 to 7 in the morning, to read in bed till 9-10, rise, and breakfast on cold weak tea at 11-12, dine at 3 P.M., to eat a very little confectionary at 10 P.M., and go to bed between 11 and 12. I drank neither wine nor beer, toast and water, coffee, nor tea, and did not smoke. I took no exercise beyond a moderate walk, which did not extend further than through the park of the castle; and I passed my time, chiefly, quietly at the reading-desk. In other respects, I was in good health, tranquil frame of mind, and at the age of fifty-six. So much for the circumstances which might have had influence on the experiments. In all cases, I avoided touching with my hand every metallic object, even the lock of the door, which I let others open for me, for a quarter of an hour before the trial of the feeling; after meals, when I had used silver instruments, I always let some time elapse before I gave my hand to be examined. I also avoided allowing the sun's rays to fall upon me, or going near the fire.

257. Since the standard which could be taken depended merely upon feeling, that is, upon the appreciation of a sensation, which could not be controlled by any scale, it can only lay claim to a moderate amount of accuracy. To approach as nearly to the truth, as was possible, under such circumstances, I repeated the same experiments five or six times; those, namely, in which I let my hand be felt, and marked down the result, hourly, from the morning till late at night. This operation is illustrated in fig. 1, and the various

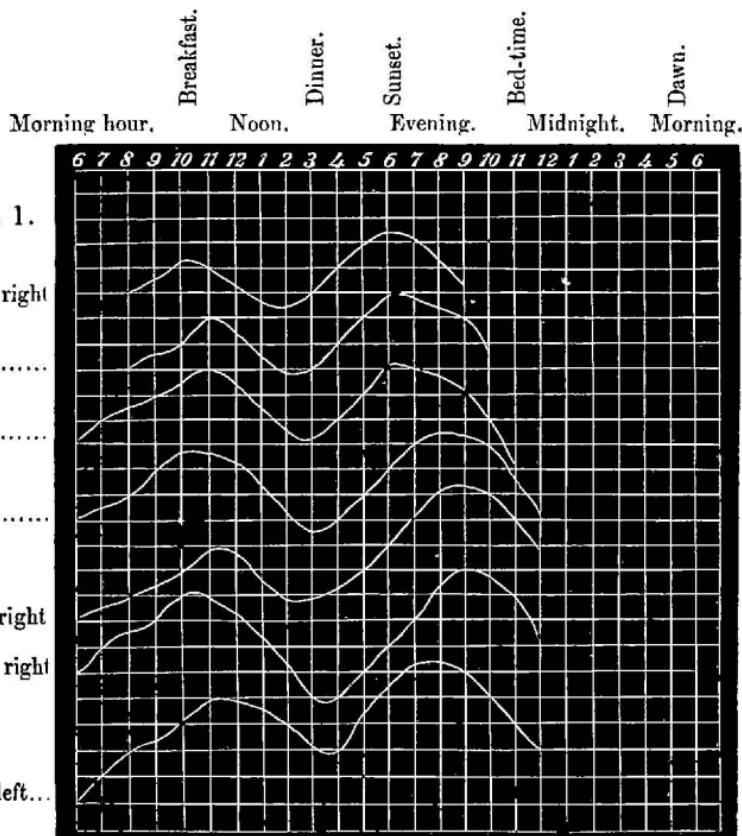


FIG. 1.

Man's hand, right

Ditto.....

Ditto.....

Ditto.....

Girl's hand, right

Man's hand, right

Man's hand, left...

results collocated. The agreement which is found between the various series of observations is almost astonishing, and proves that the sense of feeling of the observer, as I have already frequently noticed, possessed a very high degree of clearness.

As soon as I attained conviction from this, that observations of conformable conditions could really be obtained in this way, I extended the operation in various directions. I continued them through the night, had them made by females, among others by the observer on herself, &c. I then caused the particular organs of one and the same person to be investigated, and finally, the similar organs of the same persons to be compared with each other.

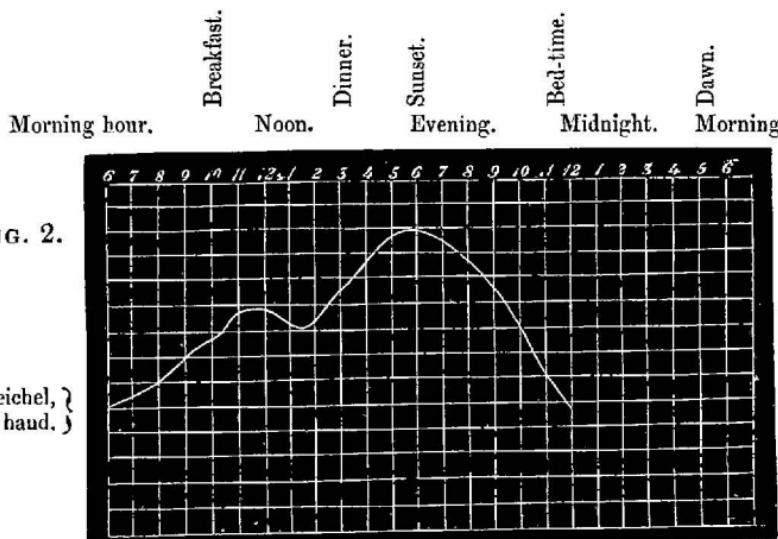
258. We will bring to light the particulars of this. In the first figure are a number of observations upon my right hand, marked by the right hand of Miss Reichel. My right is, of course, od-negative, and continued so for the whole time, since this quality never does alter. But the quantity of it does change, and is subject to a continual rising and falling. I call this the magnitude of the force. It is shown in the drawing, that from 6 A.M. forward, at which time the observation mostly began, a growing increase of the force occurred, till the hours of 10 or 12. Then commenced a decline, going on till 3 P.M. From here started a new ascent, and it became greater until 7 to 9 P.M.; then followed a continual decrease until late in the night.

This plate, with its often-repeated observations, proves that from the time of awaking, although I remained for hours reading in bed, the Od increased in strength in my right hand, growing greater continually after breakfast until toward noon. The rising day, therefore, strengthened the hand. The decline which now appeared, endured exactly till dinner-time, and it hence became evident, that it was the awakening of hunger which brought on the decrease of strength. For scarcely had this been appeased by the dinner, when, with the first spoonful of warm soup, the decline ceased, and the force immediately began to rise, and so on to its maximum, which was attained in the evening at the time of the departure of daylight. Similar experiments with Miss Maix and M. Schuh yielded similar results; both

found my hands to influence them more powerfully after dinner than before.

There will be observed on the diagram a slight tendency to decline about 9 or 10 A.M. This relates clearly to the breakfast, the desire for which then arises; this case is an appendix to the greater decline before dinner, and serves to corroborate it.

259. In order to make certain of the correctness of the view which I had formed on these points, I caused the experiments to be performed by a person who took meals at different times of the day. Miss Reichel herself dined at my house at 1 o'clock instead of 3. She could observe her own right hand very well with her left, and so undertook this task. A wholly different line was now formed. (Fig. 2.)



The same increase of the force appeared generally from morning to noon; its decline, however, which also commenced now, did not endure till 3 o'clock, but extended only till 1, the hour of her dinner-time, and then ceased at once, to make way for a new ascent of the odic force, which then continued to increase for exactly the same time, and reached its culmination, when the day began to disappear.

A little decline was also observable with her at the period before breakfast, which gave place to an increase directly she had taken the meal.

260. From these comparative experiments it follows, therefore, that *hunger diminishes the strength of the Od in the right hand ; taking food increases it.* We here clearly come upon the effects of chemism, as they have been elucidated in the fifth of these treatises. The food received becomes the prey of chemical force ; digestion, that is, decomposition, begins, and odic action is produced ; chymod becomes free, if we like so to express it. It makes no difference whatever, how much or how little share may be attributed or denied to vitality, in these decompositions,—decompositions they remain, and from them arise manifestations of Od, which diffuse themselves over the organism, and strengthen its members.

261. The question of the day being answered, that of the night remains. What is our odic disposition during the time when the luminary of the day, with its vast source of Od, is wanting, and the powerful influence of sleep comes over us ? To investigate this, the sick observer must keep awake, and the healthy subject sleep, and the examination must be continued hour by hour ; so that the affair was clearly not without its difficulties. However, I succeeded in persuading Miss Reichel, by explaining to her the scientific value of such an investigation, and the undoubted merit attaching to her for it, to come, since she did not sleep, hour by hour through the night to my bedside, to examine the condition of my hand, and note the result. There was no other means, since, in order to obtain a true result, it was indispensable that I should lie and sleep in my usual bed, as on other nights. Fig. 3 shows the result of various modified observations on myself and other persons. From the morning forward, the Od increased on my right

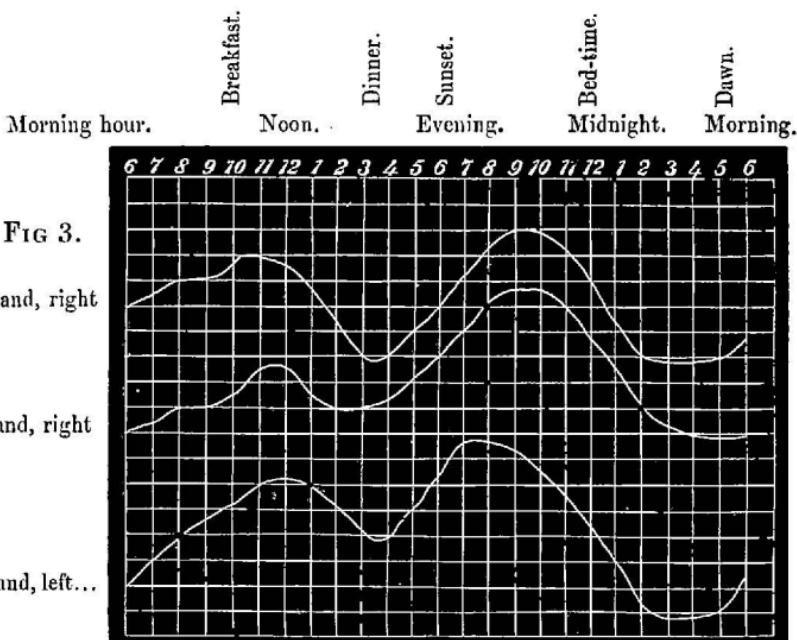


FIG 3.

Man's hand, right

Girl's hand, right

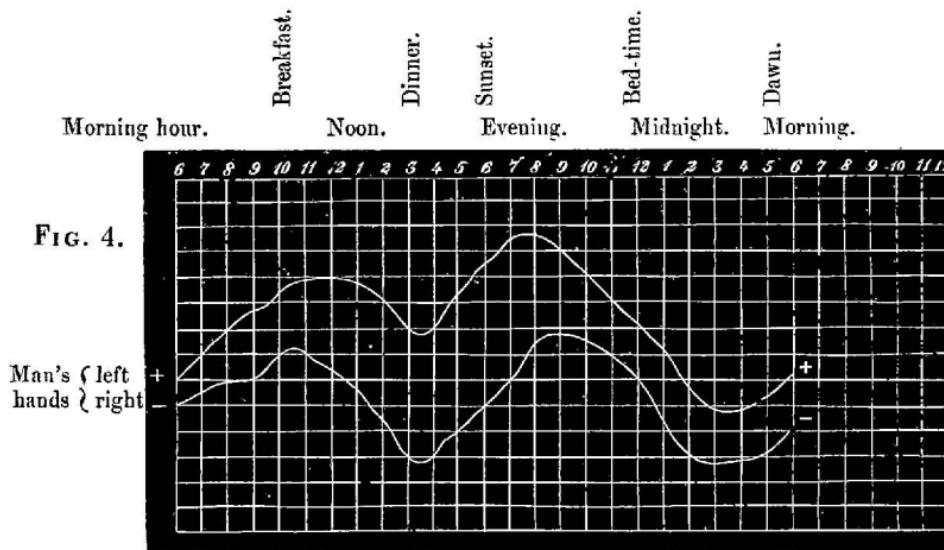
Man's hand, left...

hand, some interruptions through hunger being left out of view, through the whole day till at least 6 o'clock in the evening, at latest till 9. It now most distinctly turned, and fell continually till 2 or 3 A.M., when it attained a stable minimum, which endured to break of day; at the time of the experiment about 5 to 6 o'clock. Then, however, as the grey dawn drove away the darkness, the force was at once aroused, and fresh life reinforced the organic world; Od and vital force increased anew throughout the whole day as long as the sun sent down rays from heaven.

262. Here, also, I was permitted to find confirmation of a law discovered earlier in a different way. The sun, the one great source of Od, sends it to us with light and heat, and thus, throughout the whole day, imbues with it all that it shines upon. *Directly the sun sinks below the horizon, the odic tension sinks in the human organs*, and with commencement of this change comes also to living human beings, weariness, dulness of the senses, and sleep. *When the od-spring of day ceases to flow, the fountain of con-*

scious waking life becomes dried up. Not by light and heat alone does the sun call all life into existence, but it uses another potentiality as a lever, the Od, with which it impenetrates all things, even as with heat, and the fluctuations of which we are now beginning to learn how to compare and measure with the conditions of sleeping and waking. That it makes little difference here, in general, whether the sun's rays fall upon us directly, or we are in the shade, follows from the law of conductibility and distribution, as we have already learned; and wherever we may be, a proportionate share of the Od which the day brings will fall upon us.

263. But what are the conditions of the left hand here, which is oppositely polar? Will it increase and decrease in positivity in the same proportion as the right gained and lost negativity? This can only be made out by making both hands the subjects of observation simultaneously, and noting down their odic condition at the same time. Fig. 4 shows how this was carried out. The lower line shows the



course of the negative right hand, the upper that of the positive left. This latter exhibits a more rapid increase of

positive od in the morning, and again a higher elevation in the afternoon, till 7 o'clock, than the negative right. The midday hunger period does not show so deep a decline as in the right. It makes the smaller maximum, at mid-day, somewhat later, the evening one somewhat earlier, than the right. It appears to correspond to a greater energy of development of Od.

The od-positive left hand, therefore, does not follow exactly the same, but still a very similar odic course, with the od-negative right, taken in the protensive point of view (in regard to changes of tension.—ED.)

264. The brain has so symmetrical a structure that when such great inner differences appeared in the symmetrical hands as to form a perfect contrast, I could not but reflect on the deeper lying mechanism of human beings, of which the hands are but the outstretched levers. The brain, which many try, not always very happily, to plan out according to its bony shell,* might it not, perchance, be also

* Those who, from a very numerous series of facts, have possession of a truth, however much they may be in advance of the convictions of their age, can afford to allow the pleasure and the privilege of a sneer to even so profound a thinker as the Baron von Reichenbach. The sentence, to which this note refers, is unworthy of him; but we must remain content that the time must come, when further experiments, with the odic forces, will convince him of the absolute truth of Gall's ideas, published in the great work which, for its vast display of genius, sheds a lustre on the nation claiming him among its offspring. The odic flames emitted from Gall's brain have reverberated from countless orbs in space, and will enlighten the philosophy of the 19th century in this our planet; (see a little brochure entitled, the Stars and the Earth, published by Baillière: also Deleuze, Mémoire sur la Faculté de Prévision, Paris, 1836, page 33.) No case could be better calculated to ensure a conviction of the truth of phrenology than that of Miss Reichel—odically tested, in a state of full vigilance, on several organs of the brain. It is not every one who has the power of concentrating his ideas, and of willing intensely. I have this power to a limited degree, but it is combined with a heavy influence from the brain, which overpowers

gifted and imbued with the delicate potentiality of Od, and make itself as perceptible to such delicate reagents as our sensitives are? Miss Reichel found the right side of my

most impressionable subjects, to a condition of heaviness and stupidity, interfering with the clearness, and cleanliness, or sharpness of the results. My friend Mr. Thompson, of Fairfield Lodge, on the contrary, has so light and agreeable an influence, when he silently exercises his will, that obedience is yielded to him, by a patient, without a knowledge of the presence of any remarkable change of condition. I have seen him will a gentleman, in a room where eight persons were present, to perceive no one but himself, and the silent mandate has been obeyed. He has, by his will, placed the same individual, then in the light of broad day, in complete darkness. He has made him sit down and sleep in a chair, to which he was obliged to adhere by an ungovernable force, and then he has played with his will upon several of the organs of his brain in succession, obliging him to manifest the pathognomy of each in its turn. If the fluid of the human will, the odic force, can do this in the case of Mr. J. B. C., will it not be equally possible to perform the same experiment, on the phrenological organs of Miss Reichel, in Vienna? A large crystal, held with its point, in turn, towards each individual organ, would make Miss Reichel manifest the faculty of that organ. It is essential with some,—so delicate an instrument is the human brain, even with the protection of "*its bony shell*,"—not to perform such experiments as these for too long a period at one time, and to avoid too hasty a transference of the Od force from an attractive to a repulsive organ. Insanity has resulted, from eager or careless ignorance, where the subject has been very impressionable. I have known melancholy instances of this fact. The obvious cure bears out the Baron's philosophy, that in Nature, the Od force positive (or, according to my view,* attractive) is engaged in growth or progress in advancing life. It has energy for its type, while the contrary pole tends to death, or retardation—sluggishness of action. The march of healthy progress has the allied forces of our amiable feelings, sacred morals, and good intellects, characterised by vivacity, cheerfulness, benevolence, and charity; while the repulsive agencies of bigotry, tyranny, and the evil influences of pride, cunning, and suspicion, are characterised by a melancholy desire to coerce and destroy all opposed to their leaden powers. The Baron, an enemy to superstition, should study Gall's Philosophy, which he will find to be a series of truths, in full harmony with all other noble truths capable of being illustrated by the brilliant light of the Odic force.

* Zoist, vol. iv., p. 254, *et seq.*

skull cool, exactly like my right hand, but much stronger, while the left side was warm. This was the case, not only in me, but in all other persons whom I subjected to the investigation, male and female, all alike. I may especially mention M. Th. Kotschy, who allowed Miss Reichel to make an accurate examination, and whose head, sides, and hands, she found to agree exactly qualitatively with mine. This appeared to me really much more worthy of a fundamental examination than the hands could be, and therefore I repeated the 24 hours' inquiry on two different days and nights, on the 18th and the 23d of October, 1844. Fig. 5

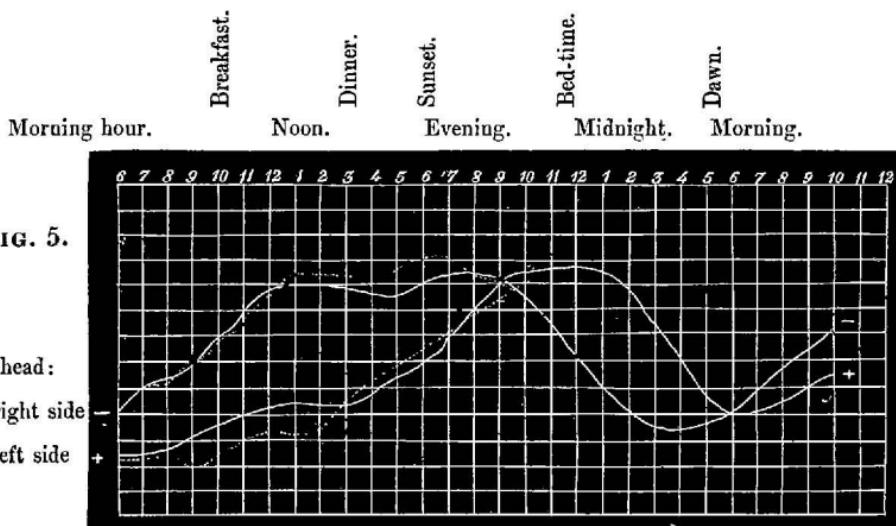


FIG. 5.

shows the course, the continuous line indicates the path of the first investigation, the dotted of the second, which could only be carried to 10 o'clock in the evening.

265. This operation furnished remarkable acquisitions. It showed that as an unequal course occurred at the same times in the hands, so, also, did it to a far greater extent in the two sides of the brain. The left side increased in strength much more slowly than the right in the morning ; till toward 3 o'clock, it was scarcely of importance ; while the right had already attained its first maximum at 1 o'clock, which was scarcely inferior to that it attained in the evening.

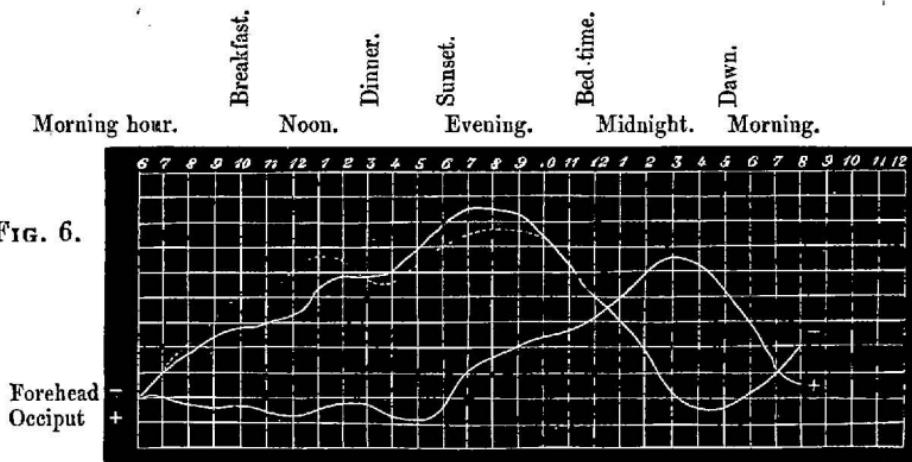
The weakness from hunger, before dinner, existed on both sides, but far smaller than it showed itself in the hands. While the right side advanced almost on a level till 9 o'clock, the left rose unceasingly from 3 till 11 P.M. The right began to sink already about 8 P.M., to cross the left and fall deep below it, while the left did not begin to descend from its culmination till 1 A.M.; that is, five hours later. The morning rise was, however, almost simultaneous.

The conclusions to be drawn from this, are : *the course of the brain is, on the whole, analogous to that of the head* : increase in the morning ; at noon, a temporary decline ; upper culmination in the evening, and lower culmination about 4 A.M., agree pretty nearly with each other, and thus probably with the daily course of the whole organism, in a mode of life like mine. But the brain exhibits a difference from the hands, in the far smaller participation in the influence from hunger, and the satiation of the stomach. *The organs of the understanding and soul appear to take less notice of the crude nutrient operations, than the matter-ruling hands.**

* Again, to direct attention to the philosophical views of Gall. "*The organs of the understanding*," under the circumstances here detailed, have no greater relation to "*the crude nutrient operations*" than the organs of sight, hearing, smell, taste, and touch. Each portion of the brain has its destination, and the presence and emission of the odic force, beautifully shown, with the Baron's usual ingenuity, to be dependent on the relative circumstances of the individual, may be inferred to be accumulated or increased in parts, according to the energy with which those parts act, at various periods of the day, or under various circumstances, stimulating the parts to activity. The progress and culmination in the two opposite courses are just those which are observed in the activity or lethargy of the organs at the fore and back parts of the head. Reichenbach tells us, § 266, that "the fore and hind parts of the head are more different, anatomically, than the right and left sides of the brain," and his researches have established just that which might have been expected from Gall's demonstrations of the functions of these two parts. Gall doubted the discovery of Mesmer. Reichenbach appears to be ignorant of the deep truths contained in the works of Gall; and yet, by establishing the existence of the odic force, he has placed his Viennese

In fact, nature has done well to provide that the forces of the soul, pre-occupied with cares, should not decline immediately that food is wanting. The difference of the two sides of the brain between themselves, shows us that the right side inclines to sleep much earlier than the left, as well as rises to the strongest animation much earlier in the morning than the latter: therefore, betrays generally a greater excitability, but not greater strength, than the left.

266. The fore and hind parts of the head are more different, anatomically, than the right and left sides of the brain, and I was desirous of bringing this opposition also to the test of the present researches. This operation was also performed twice, on the 19th and 20th of October, each time through twenty-four consecutive hours, and it is expressed in Fig. 6. Here the differences offered a stronger contrast.



The forehead in general manifested cold, the back of the head considerable heat, and this not only in men, but in animals; it occurred so in the house-cat, and when from the hint this afforded, I led the observer to my stables, she found it also in the horses and cows, especially a strong warmth in the hollow of the neck of the last. The forehead of human beings became in like manner greatly exalted in the morning, with the dawning of day, took but small share in the effects

of the matutinal and mid-day periods of hunger, and reached its culmination after sunset. During the whole of this time the back of the head remained almost unchanged, so that at six o'clock in the evening it was exactly in the same place as at six o'clock in the morning. But then it suddenly arose, almost at the same time that the forehead began to enter upon its retrograde course.

From this point forward, they are seen to cross diagonally, and while the back of the head continually rises until 3 A.M., the forehead falls incessantly till about the same hour; the one to reach its upper, the other its lower culmination, almost at the same moment. From this point, again, the opposite course commenced, and while, after three o'clock, the exalted back of the head fell rapidly, toward 4 o'clock the deeply depressed forehead began in like manner to rise quickly.

267. This motion is a representation of our waking and sleeping. The forehead represents the functions of waking life; the back of the head, of sleep. The forehead advances with increasing odic invigoration and operative activity, from 5 in the morning, with break of dawn, to sunset; then it loses the od-spring of the luminary of the day, and sinks again incessantly from its height, until the new day begins to break, when the force comes anew to rejoin it. The back of the head, on the contrary, passes quietly through the whole day, almost without motion; but so soon as the sun has sunk below the horizon, the hour of its nightly labour has struck. Now arises the Morpheus, and with rapid steps he advances, until the first traces of morning's light remind him the forehead is on its way to free him from his work; the back of the head sinks from its greatest to its lowest elevation, at the close of night, just as rapidly and uninterruptedly as the forehead sunk from its, at the close of day. Thus the two not only shew themselves opposed in polarity,—since one is warm, that is od-positive, and the other cold, consequently od-negative,—

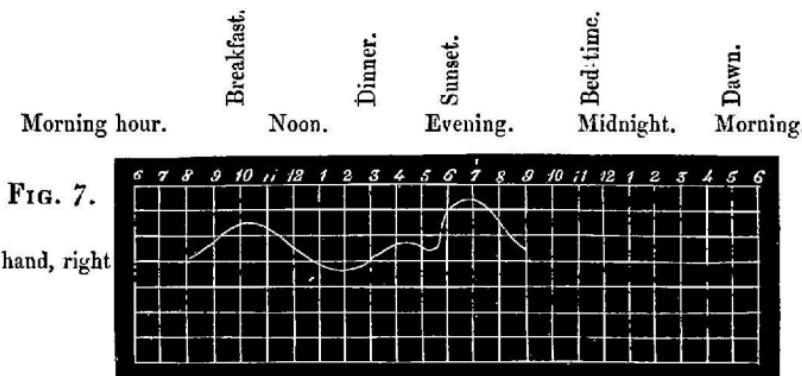
but they are as diametrically opposed to each other in their operations as are day and night, waking and sleeping.

268. From this comparison it is seen, that between waking and sleeping, in relation to Od at least, there is not an opposition like that between activity and rest, like that between motion and stillness ; but only that *the focus of activity is changed*. The force does not cease to act ; it does not diminish, but it removes merely from the front of the brain to the back, and in proportion as the front gives up intensity, the back seizes it. Sleep thus declares itself, not as a decline of the vital activity, but only as a displacement of it. In just the same measure as the vital force is active in the forehead in the day, does it rule in the hinder part of the head during night. Sleep, therefore, is only an alternation in the functions of our organs and powers ; in no way an introduction of any kind to a state of rest of them ; and the poets may use the comparison of sleep with death as a metaphor, but the physiologist cannot, in the consideration of organic life.* Vitality is exactly as energetically active in another direction during sleep, as in the waking

* Dr. Elliotson says, "I have often seen the eyes close forcibly in the mesmeric sleep-waking. It is usually thought that in sleep the eyes close from the relaxation of the muscles of the lids, exactly as the head drops, and the whole body ceases to support itself. But I believe that they close from the contraction of the muscles, just as the iris somewhat contracts at the moment of falling asleep, or of shutting the eyes, and remains contracted, and the raising muscle of the eye (*levator oculi*) contracts at this moment, rolling the eye somewhat upward, and remains contracted : two circumstances proving that sleep is not a purely passive state, but active in regard to the muscular portions of the eye itself. In falling asleep and on first waking, we feel not a weakness, but a stiffness of the lids ; the lids appear to close actively, and the under lid ascends a little at the moment of final closure ; and this cannot be the effect of relaxation, but must result from contraction, and the case of the upper lid cannot be supposed to be different from that of the lower, which conspires to the same purpose with it."—See *Zoist*, No. IX., vol. iii., pp. 44-45. *Observations by Dr. Elliotson.*

condition. The business of sleep is governed by the cerebellum: while the forehead suspends its mental labour, and when it takes to it again, to which it is aroused and qualified by the radiations of the sun, the back of the head lowers its claims upon the vital force.

269. A small accessory, but yet not contemptible support to this, is afforded also by Fig. 7. I had become



sleepy soon after dinner, and resting my head on the back of my chair, I slept for ten minutes. During this, and shortly before and after, the sensitive observer felt my right hand. The result is shown in the diagram, marked distinctly between four and five o'clock. While on all other days, the force increased continually during this time, it here made an anomalous leap downward, but then rose again normally. Therefore, the short sleep into which I had fallen had sufficed to produce a very perceptible change in the distribution of the Od in me; as long as it endured, the manifestation of odic force in the hand rapidly diminished; the ordinate of the force was shortened, and then increased again when I awoke, and all the vital functions again took up their previous directions.

270. The pit of the stomach is a region of the human body which plays a very peculiar part in the somnambulists. Anatomical investigations have been made by many, to find a peculiar organ there, and it has been surprising that

nothing special has been met with, to which could be attributed the extraordinary effects, that very often occur, at the pit of the stomach, in the so-called clairvoyants. Neither have Pacini's corpuscles, which have been the most recent things referred to in this question, any distribution in the body, of such arrangement as to correspond with the relative strength of the sensitive parts of the body. But it is not at all necessary that a special organ should exist, in which special concentration of odic phenomena should be met with. At such points, where nature acts with the all-penetrating dynamics, no such palpable apparatus is requisite. They are the combined results of innumerable many-branched components, constituted by the nerves, plexuses, ganglia, &c.; the point of most concentrated effectiveness may fall, therefore, where it will, be it the most unimportant part of the belly. My desire to become acquainted with the course the Od followed in the pit of the stomach was very great. I succeeded in bringing about a twenty-four hours' investigation on myself. Figure 8 shows the result. The line,

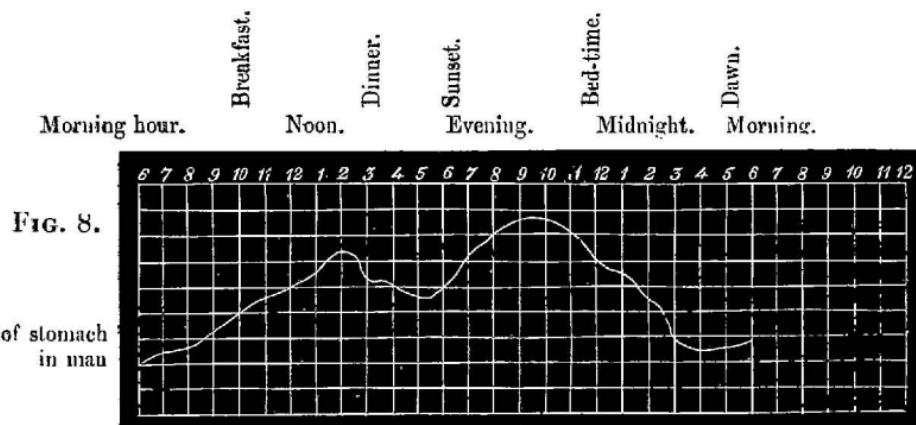


FIG. 8.

which represents this, varies but little in its curves from that of the hands. The distinction is shown merely in some changes of time and partial postponement. The effect of hunger began first at two o'clock, but extended far beyond

dinner-time, to five o'clock. The evening culmination, too did not happen at sunset, but at 10 p.m. The course of the pit of the stomach thus did not afford anything special, but supported the doctrine that the series of effects of the sunrise, hunger, satiety, and sunset, are extended in the same way over the lower part of the body. Phenomena of another kind, however, which were produced by emotions of the mind, and reflected on the physical functions, were expressed the more distinctly and definitely at the pit of the stomach. I cannot speak of these until some future period, and must be content here to give a preliminary indication.

271. In order to see whether the course of the development of Od was at all different in the female from that in the male sex, I caused a 24 hours' investigation to be made on the right hand of my daughter Hermine. Figure 9

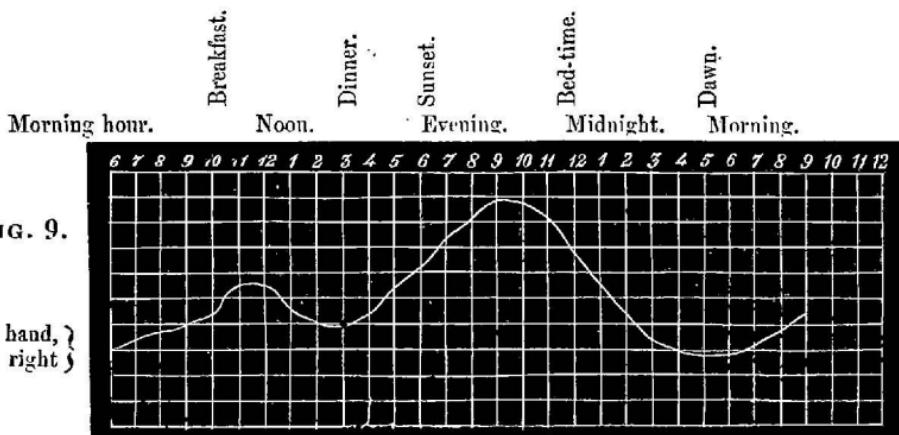
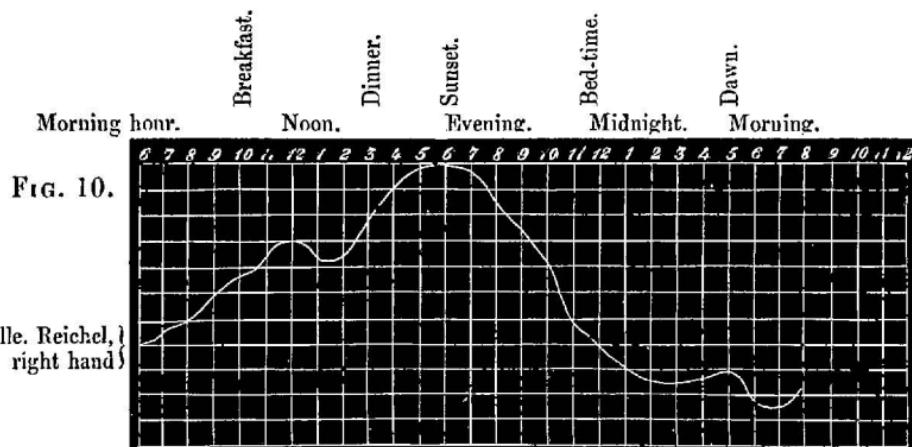


FIG. 9.

Girl's hand,
right }

shows that it varies so little from that of my right hand, that the difference might almost be attributed to the inevitable inaccuracies of observation. Therefore in this respect there is no difference between the two sexes.

272. Figure 10 is a second support to what has just been said. It is the line of the right hand of Miss Reichel,



which she laid down from feeling it with her own left during twenty-four hours. It is to me of value to get possession of the course of the odic phenomena in a highly sensitive person during her diseased condition. The diagram shows that it does not differ in any respect from that of the healthy, and merely deviates in the order of time of the phenomena, in so far as Miss Reichel dined at a different time, two hours earlier than myself and children.

273. On the other hand, there occurred an accessory observation which appears deserving of mention. On the diagram is seen a fresh, sudden, and rapid decline of the force at 5 o'clock A.M., just at sunrise. At the very moment when this began, she was suddenly seized with an attack of pain in the stomach, which lasted till 7 o'clock. The appearance of this pain not only at once restrained the appearance of odic development, but quickly depressed it to a much greater extent. As soon as it disappeared, the force increased normally.

274. It is also deserving of remark, that although Miss Reichel was never quiet during the whole of this night, but got only, now and then, some seven or eight minutes of light sleep; nevertheless, as the figure shows, the entire nocturnal

period, from sunset to sunrise, afforded the same contrast of daily increase, and nightly decline, as in the healthy, who are completely buried in sleep.

275. From this last series of investigations many further physiological truths may be deduced ; I will here only bring forward a dietetical theory. If the day with the sunlight and the increasing Od in the forehead and hands is appointed for the voluntary intellectual functions, and the night with the then declining Od, which now removes to the back of the head, to the more unconscious vegetative functions, all of what we do and suffer that corresponds to this arrangement of nature must be favourable to our constitutions and to our health ; on the contrary, all that contradicts it must be obstructive and injurious to our welfare. Taking food is, as we have seen, favourable to the increasing Od in the forehead and hands ; the effect of the chemical action arising from this unites itself with that of the sun's rays, and, in conjunction, they elevate the development of Od, and with that the active force of daily life. We therefore promote our welfare when we eat in the day, even as nature has appointed the day-time for it. But the chemical action of digestion continues for several hours ; it may therefore happen, that we shall take food at such a time of the day, that the digestion will be prolonged into that time when the sun's rays have already disappeared, and the Od, consequently, is sinking in the hands and forehead. Then, the effect of the increasing Od, from the chemical decomposition, would run directly counter to that declining from the absence of the sun. This would cause a conflict in the organic actions. Thus, a new theoretical ground, that is, an explanation, is afforded of the old practical experience, that one should not eat in the evening, and in general not for several hours before going to bed ; and that if this be done, imperfect sleep, with restless dreams, *i. e.* half-con-

sciousness, semi-activity of the front of the head, will be the consequence. It might be thought that the developed Od would then withdraw to the back of the head, and thus favour sleep ; this, however, not only contradicts the general experience, but also the special observation here upon me. For, by the experiments and diagrams, it is shewn that in Miss Reichel, who took dinner at 1 o'clock, the decline of the Od in the hands, together with that in the front of the head going parallel with it, commenced exactly at sunset ; while in myself and my daughter, who did not dine until 3 P.M., the same decline began about 8 or 10 o'clock ; thus just as much later as we had taken our meal. In Miss Reichel, therefore, the stronger development of Od from the chemical action of digestion had already ceased when evening arrived ; while in myself and my family it endured some hours beyond, and in some cases made equilibrium against the decline of that Od coming with the sun (heliod) ; sometimes exceeded it in strength. Therefore, whoever wishes to go late to sleep will do well to take the principal meal at a proportionately late hour of the day.

276. But he who does this acts in opposition to the natural arrangements of the animal functions, and certainly injuriously affects the duration of his health. It is known from other experience that the sleep before midnight is the deepest, soundest, and most strengthening, and cannot be replaced, to equal benefit, by any arbitrary supplement in other hours. The above researches indicate strengthened reasons for the explanation of this. Nature has appointed the order for the whole animal, and apparently the vegetable world also, with few exceptions, that with the departure of the sun's rays, with the reversal of direction of Od in the organism, sleep also should appear ; and *vice versa* that it should cease when the sunbeams and Od return to the forehead. If we go to bed late at night, we must sleep long into the day next morning. But then we have the course

of the heavens, and with this the odic direction, against us, and the morning sleep does and must, for the same reason, be bad and unrefreshing ; which it will also be, when we go to sleep with a newly-filled stomach : we are under the influence of a false direction of the odic development. People who go to bed and rise late, are, on this account, generally more languid, and more deficient in cheerfulness in the morning, than those who accommodate their mode of life to the order of nature. From all this it results, that whoever wishes to insure the duration of his health, with regard to the course of nature, which has such a profound influence therein, must rise at latest with the first rays of the sun, take the principal meal best at 11 or 12 o'clock, but never after 1, eat little or no more later in the day, and go to bed at twilight. Thus do all animals, thus does half savage man in the state of nature, thus do all the poor and needy in the country ; only the so-called enlightened people of our towns do better : they sup at 10 or 11 at night, go to bed at 2 or 3 o'clock, and afterwards send for the physician for gout, scrofula, and spleen.

Throughout the present treatise, we meet, in all the observed phenomena, without exception, a condition in which the Od displays itself through excitation of sensations either of tepid warmth or coolness. We are able to distinguish four kinds of modification, in the conditions in which we are able to detect and discover it, by means of these impressions on the sense of feeling. *First*, namely, it occurs introduced into bodies from without *by transfer*, and then depends upon other odic objects, through the actual contact or mere approximation of which, the Od has been conveyed to or excited in it ; to which belong, therefore, reception of the rays of the heavenly bodies, as well as alteration of aggregation by friction, chemical activity, or heat. Odic quality derived in this way is but temporary, and of short duration. *Secondly*, it resides in *amorphous*

matter as an independent quality, and then is not very strongly expressed. *Thirdly*, it occurs in amorphous substances, as in magnetized steel, *impregnated by transfer in conjunction with magnetism*; not, however, escaping rapidly, but holding to the object as long as it remains magnetic (§ 23, note). *Fourthly*, it appears accumulated in *particular points*; as in crystals, plants, and animals, and is then of constant duration.

In the first two cases the Od presents itself *like the simple electrical charge*, uniformly distributed in the bodies; in the two last we find it *like the voltaic pile*, presenting a polarity in bodies, and not merely in the direction of one single axis, but, and especially in organic structures, in those of many intersecting ones.

The Od, therefore, possesses a manifest dualism, which presents an unmistakeable resemblance in kind to electricity.

RETROSPECT.

a. The terms "tepid" and "cool," "warm" and "cold," in the mouths of the sensitive, are not to be taken literally, but figuratively. They express a sensuous perception, which is similar to those which tepid warmth and coolness usually produce in us.

b. In crystals and magnets, one pole almost always gave them a warm, the other a cool sensation.

c. The warm pole is, as a rule, Od-positive, and may be denoted + od; the cool pole is Od-negative; therefore in like manner by — Od.

d. The lifeless, amorphous, material world forms a great series, at one end of which occurs the most od-positive body, (as yet potassium), at the other end the most od-negative (as yet oxygen), and which proceeds from the greatest odic

tepid heat to the greatest odic coolness, and thus represents an odic series of all matter.

e. Positively electrified bodies diffuse odic coolness ; negatively electrified, odic warmth, or else diminished coolness.

f. Heating a body produces manifestations of + od ; cooling, of - od.

g. Friction produces + od.

h. All kinds of fire diffuse - od.

i. From the effect of chemical activity, as such, - od is always immediately given out.

k. All odic flames emitted from od-positive bodies feel warm, all from od-negative cool ; the odic temperature of their flame-like emissions, therefore, gives a measure of their odic value.

l. In plants the *caudex descendens* has been found, on the whole, to be od-positive ; the *caudex ascendens* od-negative ; but in detail, each single organ is polarized.

m. In man, the whole left side is od-positive, the whole right od-negative. This polar opposition is, especially, distinctly manifested in the hands, and ends of the fingers.

n. Men and women are polarized in the same way. .

o. In human beings, both male and female, the odic intensity displays a difference, at different times, and in different dispositions, arising from hunger, satiety, sleep, disease, &c., sometimes increasing, sometimes declining.

p. When brought into the sphere of action of the objects diffusing Od, sensitive human beings are only comfortable when their own od-polar parts are placed opposite to the foreign od-poles of the opposite name ; when opposed to those of the same name, discomfort, and then indisposition, arise.

q. There exist in bodies conditions of enduring and temporary odic charging, similar to analogous electrical conditions ; in the first is found a decided, but in the second no perceptible dualism.

CONCLUSION.

THE experiments and observations detailed in the foregoing seven treatises, and the deductions drawn from them, when briefly summed up, yield the following axioms in physics and physiology :—

1. The world-old observation, that the magnet reacts sensibly on the human organism, is neither “ lie, deceit, nor superstition,” as many naturalists at present think and declare; but is a well-grounded fact, a manifest physico-physiological law of nature.

2. It is a tolerably easy matter, one that may be carried out anywhere, to attain conviction of the correctness and accuracy of this; for people are to be met with everywhere whose sleep is more or less disturbed by the moon, or who suffer from nervous indispositions; almost all these experience the peculiar excitation by the magnet, to a considerable extent, when it passes down them from the head over the body. Still more frequent are healthy and vigorous persons, who feel the magnet very vividly; many feel it more weakly; many detect it, but in a very slight degree; finally, the majority cannot perceive it at all. All those who detect this reaction, and they appear to constitute a quarter or a third of the human race, are here denominated by the general term of “ sensitive.” (§ 66.)

3. The perceptions of that influence present themselves, chiefly, to the two senses of feeling and sight: to the feeling, by a sensation of apparent (§ 217) coolness or tepid warmth (§ 225); to the sight, by appearances of light issuing from the poles and sides of magnets (§§ 8, 9, 15,) when the patients remain, for a long time, in deep obscurity.

4. The capacity to exercise such influence presents itself not only in the steel magnet, which we produce in our workshops, or in natural magnetic iron, but nature gives evidence of it in an infinitely varied number of cases. In the first place, there is the entire globe, which, through terrestrial magnetism, acts more or less powerfully upon sensitive persons (§ 60, &c.)

5. Then there is the moon, which, by means of exactly the same force, reacts towards the earth, and thus towards the sensitive (§ 118).

6. Further, all crystals, natural and artificial, and those in the direction of their axes, § 31, 33, 35, 50, 55.

7. In like manner heat, § 121.

8. Friction, § 127.

9. Electricity, § 159.

10. Light, § 131.

11. The rays of the sun and stars, § 97, 208.

12. Chemism, to an especial extent, § 137, 142.

13. Then the organic vital force, both in *a*, Plants, § 25 ; and also in *b*, animals, particularly man, § 79.

14. Finally, the total material world, § 174, 213.

15. The cause of these phenomena is a peculiar natural force, which extends over the whole universe, (§ 213, 214) different from all hitherto known forces, and here designated by the word "Od," § 215.

16. It is essentially different from that to which we have hitherto applied the name of "Magnetism," (§ 42) for it does not attract iron, (§ 37) nor magnets (§ 24, 38) ; bodies charged with it are not determined in particular directions by the terrestrial magnetism, (§ 42) ; they do not affect the suspended magnetic needle, (§ 38) ; they are not disturbed, when suspended, by the vicinity of an electric current, (§ 39) ; and they do not induce any galvanic current in metallic wires, (§ 40).

17. Though different from what we call magnetism, it

presents itself in all places where magnetism appears, § 43.

18. But, on the other hand, magnetism by no means appears everywhere that Od presents itself: this force, therefore, has a proper existence, independently of magnetism: magnetism, however, is never free from a connection with Od, § 43, 44.

19. The odic force possesses polarity. It appears at the two poles of the magnet with constantly different properties: at the northward (§ 225, Note) it produces a sensation of coolness in the feeling, as a rule, in the pass downward, and in darkness a blue and bluish-grey light; the southward pole, on the other hand, a sensation of tepid warmth, (§ 225) and a red, reddish-yellow, and reddish-grey light. The former is connected with a decided pleasure, the latter with discomfort and uneasy pains. Next to magnets, crystals (§§ 32, 50, 55, 220, 221) and living organic beings (§§ 84 to 89, 253) exhibit the odic polarity most distinctly.

20. In crystals, the odic poles occur at the poles of the axes (§ 32); in crystals with several axes, there are several odic axes, of unequal strength.

21. In plants, the ascending trunk is, as a whole, opposed in polar quality to the descending; but there are countless other subordinate polarities in all the separate organs. (§ 248, et seq.)

22. In animals, at least in man, the entire left side stands in odic opposition to the entire right (§ 226). The force is concentrated into poles at the extremities, in the hands and fingers (§ 254); and in the two feet (§ 23); more strongly in the former, more weakly in the latter. Within these general polarities, however, occur countless minor subordinate special polarities of the individual organs as opposed to each other, and as exhibiting an independent bi-polar condition in themselves (§ 254). Men and women do not differ qualitatively in the odic characters (§ 227.)

23. On the globe, the north pole is regarded as positively magnetic, the south pole as negatively ; in accordance with this, the northward pole of the suspended needle as negative, the southward as positive. In agreement with this, I have taken the south pole, which goes with the negative magnetic pole, in like manner for negative, "od-negative," = - od ; the other, opposite pole, for "od-positive," = + od. (§ 231.) In crystals, therefore, the pole giving the cold downward pass, is od-negative, the warmth-giving, od-positive (§ 231.) In plants, on the whole, the root is od-positive, the stem and its apex od-negative (§ 252.) In man, the left side, its hand and finger-ends, are warm, disagreeable, and red-luminous ; therefore od-positive : the right side, hand and finger-ends, are cool, pleasant, and emit a blue light ; therefore are od-negative (§§ 226, 231.) It will not differ in any animals (§ 253).

24. In direct sunlight, the red ray and those below it appear od-positive, the blue and those above it—that is, the so-called chemical ray—od-negative ; the spectrum is, therefore, odically polarized (§ 116.)

25. Amorphous bodies, without crystalline arrangement of their integral components, exhibit no separate polarity ; but each acts singly, within its limits, as odically warm or cold to the feeling ; and this reaction exhibits different degrees of intensity in different substances, so that they thus arrange themselves in succession, and form a continuous chain of gradations, in the same way as they form a series according to their electrical nature, which we call the "electro-chemical." Exactly in the same manner do all simple substances combine in an odic series, which has the strongest positively od-polar bodies at one end, as potassium, &c., and at the other, the strongest od-negative, like oxygen, &c. And since this natural grouping appears almost to coincide with the electro-chemical, it may be called the od-chemical series (§ 236).

26. Heating (§§ 122, 245) and friction (§§ 129, 246) display + od ; cooling (§ 123) and the light of fire — od. (§§ 131, 240, 244.) — Chemical action varies, in its odic value, according to the character of the substances brought into action (§§ 139, 142, 247.) But, in far the greater number of cases, they have hitherto been found od-negative.

27. Of the heavenly bodies, those which have no proper light, as the moon and the planets, appear od-positive in their principal effect (§§ 119, 208, 239) ; those which are illuminating, like the sun and fixed stars, od-negative in their chief effect (§§ 100, 208, 239). But the spectrum of them, again, shews itself polarized (§ 116).

28. The odic force can be conducted in bodies ; all solid and fluid bodies conduct Od to distances as yet unmeasured. Not only metals, but also glass, resin, silk, and water, are perfect conductors (§§ 47, 81, 113, 118, 121, 141, 167, 203). In a somewhat smaller degree only do less connected bodies conduct : such as wood, paper, cotton stuffs, wool, &c. There are, therefore, some, though only weak, obstacles to the transition from one body to another.

29. The conduction of Od is effected much more slowly than that of electricity, but much more rapidly than that of heat ; it may almost be followed, on a long wire, by making haste.

30. Od may be transferred, be brought from one body on to others ; or at least a body in which exists a manifestation of free Od, will produce a similarly odically excited condition in another (§§ 29, 45, 72, 82, 105, 118, 143, 198, 202).

31. The transfer is effected through contact. But a mere approximation, without actual contact, suffices for it, though with weaker effect (§ 202).

32. The transference is not performed very quickly, but requires some time, several minutes, for its completion (§ 48).

33. Neither in conduction, nor in transference, does polarity appear in the establishment of Od in the bodies ;

this appears rather to be an application of a certain molecular arrangement to the matter.

34. The duration of the odic condition in bodies, after complete charging, and the removal of the charging object, is brief, different according to the quality of the material, seldom perceptible, beyond a few minutes, to healthy vigorous, sensitive persons (§§ 82, 167, 169); sometimes sensible, even after some hours; to diseased, highly sensitive persons; for instance, in magnetised water. Matter, therefore, possesses a certain coercive power over Od (§§ 46, 83, 112, 205).

35. Bodies which have been odized by conduction, or charging,—*e. g.* metallic wires,—afford sensible emanations of Od at their opposite extremities; warm or cool, positive or negative, like the poles from which they issue (§§ 107, 114, 119).

26. Od shares with heat the peculiarity of two different conditions: one inert, slowly making its way through matter, a radiation (§§ 193, 254). In the last condition the Od from magnets, crystals, human bodies (§ 254), and hands, is felt, by healthy sensitive persons, instantaneously, and without any perceptible interval of time, at the distance of a long suite of rooms. All the processes which the inert Od diffuses slowly over bodies are radiated by it, simultaneously, in all directions, but with varying strength; thus friction, electricity, heat, chemical action, matter in general (§ 201). The rays of Od penetrate clothes, beds, boards, and walls (§ 23, note), but evidently less easily and quickly than magnetism, and with a certain slowness. The conduction and transfer by means of mere approximation of the poles of crystals and magnets, the hands, amorphous bodies of high od-polar rank, &c., appear all to depend on radiation of Od; to which, therefore, belongs also the so-called magnetization of sensitive human beings.

37. Electric currents, conducted through sensitive persons, produce no observable odic excitement, nor do they affect

them immediately, perceptibly differently from all other persons (§ 160); but mediately, more strongly in proportion as they produce odic disturbances in other bodies (§ 167). Metals placed within the sphere of electrical action exhibit the most vivid phenomena of Od (§ 168).

38. The light, which odically excited bodies emit, is always weak, and from this weakness, is not visible to every eye. Persons who are not exceedingly sensitive, are obliged to remain for a whole hour, or even two, in absolute darkness, before their eyes were sufficiently prepared to be fit to perceive the odic light, and it was necessary that they should not, during this time, have received a trace of other light. But the cause of this cannot lie in a special acuteness of the eye alone, because all who see Od light are, without exception, gifted with the peculiar excitability to detect the odic impressions by feeling, to distinguish them according to apparent warmth or coolness, according to agreeable or unpleasant sensations, which are not subject to change. Since these different capacities are always all present, simultaneously, in particular persons, or are all simultaneously absent, they must be regarded as connected, and appear to depend upon a peculiar disposition of the whole nervous system, which we are unacquainted with, and not upon a special quality of separate organs of sense.

39. The odic light of amorphous bodies is a kind of inward and outward glow, showing through the entire mass, like phosphorescence, and perhaps depending on the same cause; a thin luminous veil, like a delicate down-like flame, surrounds it (§ 207). In different bodies this light occurs of different colours—blue, red, yellow, green, purple, mostly white and grey. Simple bodies, especially metals, are most brightly luminous (§ 206); compounds, like oxides, sulphurets, iodides, hydrocarbons, silicates, salts of all kinds, glasses, nay even the walls of a room, are all luminous (§ 206).

40. Where the odic light occurs polarized, as in the

magnet (§ 3, 6), and in crystals (§ 55), it forms a flame-like stream, issuing from the poles, proceeding almost in a right line from the arms of the magnet, and the axes of the crystals, and spreading out somewhat at a distance from the poles, while it diminishes in intensity of light. It displays all the brilliant colours of the rainbow (§§ 9, 13) but remains predominantly red, at the positive poles, and blue, at the negative. At the same time, magnets, crystals, and hands, like the amorphous bodies, remain luminous, glowing odically throughout their mass, and in like manner surrounded by a fine luminous vapoury veil (§ 8).

41. Human beings are luminous almost all over the surface of their bodies, but especially on the hands (§ 92), the palms of the hands, the points of the fingers (§ 93), the eyes, different parts of the head, the pit of the stomach, the toes, &c. Flame-like streams of light of relatively greater intensity flow from the points of all the fingers, in a straight direction from where they are stretched out.

42. Electricity, even the mere electrical atmosphere, produces and strengthens the odic luminous phenomena in a high degree (§ 167); not, however, instantaneously, but after a short pause of a couple of minutes (§ 169).

43. The electro-magnet behaves like the common magnet in regard to the odic light emanations (§ 12); and it is capable of strengthening the luminous phenomena, simultaneously, in just the proportion that it is susceptible of magnetic exaltation.

44. The rays of the sun and moon produce odic charging in all bodies on which they fall; and this, conducted by wires into the dark, gives odic flames at their points (§§ 114, 119.)

45. Heat (§ 125), friction (§ 129), and the light of fire (§ 134), produce visible luminosity on wires and their points carried into the dark; a flame resembling that of the candle.

46. Every chemical action, though merely a simple solution in water, or a resumption of water of crystallization by

effloresced salts, effects exactly the same, in a strong degree, on wires inserted in them (§ 146). But processes of decomposition independently emit odic flames, and diffuse odic glow (§ 145).

47. The positive pole gives the smaller, but more luminous flame ; the negative, the larger but less intense : the former became yellow and red ; the latter became blue and grey. The odic flame radiates light which illuminates other bodies in the vicinity. It may be collected by glass lenses, and concentrated into a focus (§ 18). The luminous odic emanations of bodies, and their poles generally, must therefore be distinguished from odic light, in the narrower and more peculiar sense of the word.

49. All odic flame may be made to flicker by currents of air ; be diverted, caused to wave, blow about, and broken up by blowing on it (§ 20) ; meeting with solid bodies, it bends round them, follows their surface, and streams forward on them, like flames of common fire (§ 20) ; it is evidently of wholly material nature.

50. We can give it any direction we please,—upward, downward, toward any side ; it is, therefore, up to a certain point, independent of the influence of terrestrial magnetism (§ 20, 23).

51. The emanations of odic light seek plane and solid angles, and points (§ 3), and, like electricity, find more ready issue there, agreeing with the obstacles to transition observed in conduction ; at such places the differences of temperature and luminous phenomena are always manifested in greatest strength (§ 114).

52. The odic flames issuing from opposite poles exhibit no tendency to unite with each other : no perceptible mutual attraction occurs, and thus there is here a total difference from the magnetic agent (§§ 3, 9).

53. All od-positive bodies emit warm, all od-negative cool odic flames (§ 223). The odic flames, therefore, bear, in

reference to the apparent temperature, the character of their pole; and this consequently affords an expression of the odic quality of the body to which they belong (§ 241).

54. In many conditions of disease, especially in cataleptic attacks, a peculiar kind of attraction has been observed, exercised by the od-pole of magnets, crystals, and the hands, for the abnormally sensitive hand (§ 23). It is similar to that of the magnet for iron, but is not reciprocal (§ 24, 54); *i.e.*, the sensitive hand does not on the other side exercise any perceptible attraction for the od-poles (§ 23, 91). Even objects rendered odic by conduction and transfer, produced this striking effect to some extent (§ 28).

55. In the animal organism, night, sleep, and hunger diminish the odic emissions; food, daylight, and activity elevate and increase them (§ 260, 262). In sleep, the focus of odic activity is removed to different parts of the nervous system (§ 268). Within the twenty-four hours of the day and night, a periodical fluctuation, a decrease and increase of it, occurs in the human body (§ 265).

56. Certain applications of the odic laws, discovered in the present researches, have been made, in the partial explanation—of the so-called magnetized water (§§ 27, 28, 73, 105, 112); of the light in rapid crystallization (§ 55); of the luminous appearance observed over graves (§ 158); of the mysterious affairs in Pfeffel's garden at Colmar (§ 156); of the so-called magnetic tub (§§ 135, 151); of certain effects of digestion (§ 152); of respiration (§ 153); of many strange antipathies of mankind (§ 175); of the necessity of placing sensitive diseased persons in the magnetic meridian (§§ 69, 71); of the attraction of magnets and hands for cataleptic persons (§ 23); of the odic condition of the human body (§ 79, *et seq.*); of the daily and hourly alterations of this (§ 256); and lastly, of some of the peculiarities and causes of the aurora borealis (§ 21).

P R E F A C E.

277. It was objected, that the five girls whom I employed as re-agents in my former researches, were insufficient, where the question was the establishment beyond doubt of important scientific truths. I admitted that this might be the case, and endeavoured to extend my investigations over a greater number of persons, who should furnish a great variety of conditions. In this way more than two years have passed by, during which, on that account, the present treatise has necessarily been delayed. Now, however, it appears with the support of *almost sixty sensitive persons*, men and women, mothers and maidens, children and aged persons, low and high, poor and rich, weak and strong, sick and healthy, menstruating and pregnant women,—a multiplicity of conditions is now represented which can leave little more to be desired. But the most essential accession which the work has received through these, lies in the fact that *perfectly healthy, strong persons* are included in considerable numbers in the list; that men who have never suffered illness, and who have passed their lives in continued hard bodily labour, have perceived the peculiar sensations and the luminous appearances which constitute the object of these researches, exactly in the same manner as young ladies who pass half their lives upon a sofa; that neither youth nor age, sex nor position in life, make any difference, and that the sensitiveness is not a diseased condition, but rather a peculiarity of many persons, which merely appears more or less strongly, or becomes imperceptible, under various circumstances. The subjoined list will show that even more than half the persons who have had the good will towards me and towards the cause of science, to

devote themselves to these investigations, consists of perfectly healthy individuals. I have found, to my great astonishment, that the number of the sensitive surpasses all expectation among mankind generally; that a number of persons, who are far from even suspecting anything of the kind themselves, clearly perceive the *odic* sensations, and the luminous phenomena, after having remained a sufficient length of time in the dark. In fact, this holds now to such an extent, that at present I scarcely ever require sick persons for my experiments; and it not only suffices to employ the healthy, but I am nearly in a position entirely to exclude the sick, and especially somnambulists. The objection, therefore, that the observations are not supported by sufficient testimony, as well as a second, that the evidence of diseased observers does not deserve full trust, will be answered in the following pages, and must henceforth be given up.

As to the reason why I have not earlier brought forward a greater number of witnesses for my observations, I have already explained this above, § 6; I have feared to weary the reader by a superabundance of material. Now, however, that this is pointed to as an imperfection of my work, I no longer hesitate to make use of all the evidence at my command, and thus to place my thesis on the broadest foundation; the same phenomena will be seen to present themselves under the most varied circumstances, and the reader will now be in a better position than before to repeat them everywhere and with facility. For convenience of reviewal, I subjoin the

LIST OF NAMES OF THE PERSONS

Who, from their capacity for sensitive perceptions, have supported me in my labours by their co-operation and observations.

Mrs. Cecilie Bauer, wife of an inn-keeper, No. 161, Braunschenschgrund, Vienna.

- Miss Leopoldine Reichel, daughter of a civil officer of Schönbrunn.
- Miss Maria Atzmannsdorfer, daughter of a military surgeon.
- Miss Angelica Sturmann, daughter of the director of an hotel.
- Miss Francisca Weigand, daughter of a hatter, No. 60, Windmuhl, Vienna.
- Friedrich Weidlich, naval invalid.
- Miss Josephine Winter, daughter of a painter at Gratz.
- Miss Marie Nowotny, daughter of a subaltern civil officer.
- Miss Clementine Girtler, daughter of a merchant.
- Mrs. Francisca Kienesberger, wife of a steward of a manor.
- Mrs. Johanna Lederer, widow of a government official.
- Miss Maria Maix, daughter of an official, No. 260, Kohlmarkt, Vienna.
- Miss Josepha Zinkel, daughter of a householder at Nutzdorf, near Vienna.
- Baron August von Oberländer, at Schebetau, in Moravia.
- Mr. Nicolaus Rabe, government official of the Montan exchequer.
- Miss Amalie Krüger, daughter of the superintendent of an hotel, No. 27, in the Leopoldstadt, Vienna.
- Miss Wilhelmine Glaser, daughter of an innkeeper at Bochitz, in Moravia.
- Alois Baier, tradesman in Vienna.
- Mrs. Johanna Anschütz, wife of M. Gustav Anschütz.
- Dr. Nied, physician in practice, No. 396, Erdberg, Vienna.
- Mr. Sebastian Zinkel, householder in Nussdorf, near Vienna.
- Miss Johanna Kynast, daughter of a baker, of Waidhofen, in Austria.
- Miss Leopoldine Atzmannsdorfer, called Dorfer, daughter of a military surgeon.
- Mrs. von Peichich-Zimanyi, widow of a Hungarian noble.
- Johann Klaiber, joiner, in my service.
- Miss Wilhelmine von Weigelsberg, No. 451, Wieden, Vienna.

Baroness Maria von Augustin, wife of Baron von Augustin,
major in the Imperial service.

Miss Sophie Pauer, daughter of the Consistorial Counsellor
Pauer, Vienna.

Professor Dr. Stephan Endlicher, Director of the Imperial
Botanic Garden, member of the Vienna Academy.

Mr. Franz Fernolendl, chemical manufacturer in Vienna.

Anka Hetmanek, field labourer on my estate, Reisenberg.

Miss Ernestine Anschütz, and her brother,

Mr. Gustav. Anschütz, artist, No. 268, Ferdinandsgasse,
Wieden, Vienna.

Mr. Stephan Kollar, junior.

Friedrich Bollmann, cabinet-maker, (blind).

Mrs. Josephine Fenzl, wife of Dr. Fenzl, curator in the Im-
perial Museum.

Mrs. von Varady, wife of the Aulic Counsellor von Varady.

Mr. Johann Studer, agriculturist, of Zürich.

Baroness Pauline von Natorp, wife of Baron Natorp, Vienna.

Chevalier Hubert von Rainey, barrister of Klagenfurth.

Mr. Ernst Pauer, Consistorial Counsellor, and superintendant
of the Evangelical Communion in Vienna.

Mr. Wilhelm Hochstetter, of Esslingen, gardener at Schön-
brunn.

Baroness Isabella von Tessedik, widow of a Hungarian noble
and court secretary.

Mr. Demeter Tirka, merchant in Vienna, (a Greek).

Miss Elise von Seckendorf, at Sondershausen, Saxony.

Mr. Constantine Delhez, philologist, Vienna, (from Belgium.)

Mr. Theodore Kotschy, the well-known traveller in Africa,
Persia, &c.

Maximilian Krüger, orphan from the Asylum, Vienna.

Hermine Fenzl, infant daughter of Dr. Fenzl.

Mr. Karl Schuh, physicist, from Berlin.

Dr. Friedrich, from Münich.

Dr. Ragsky, professor of chemistry in Vienna.

Mr. Mathias Mauch, veterinary surgeon, from Württemburg.
Professor Rössner, imperial counsellor at the Academy of
Fine Arts, Vienna.

Mr. Edward Hüttner, bookseller in Vienna.

Mr. Franz Kratochwila, government official.

Mr. Franz Kollar, curator in the Imperial Natural History
Museum.

Miss Susanna Nather, daughter of an officer of Basle, now
in Vienna.

Professor Dr. Huss, physician in ordinary to the King of
Sweden, Stockholm.

My daughter Hermine.

Dr. Diesing, Curator in the Imperial Natural History Mu-
seum.

Almost all these persons are in Vienna, and may at any time be questioned or heard. The order in which they are here enumerated, corresponds pretty nearly to a decreasing scale of the intensity of their sensitive irritability.

278. In the first place I have to premise a word or two upon another subject. In the whole course of the preceding seven treatises, I have everywhere (§§ 34, 225, &c.) assumed the north pole of the earth to be positively magnetic, and the south pole of our planet negative, and considered all other polarities, of steel bars, crystals, living organs, &c., in accordance with this pre-supposition. Since physicists are not agreed which of the two poles of the earth and the magnet to regard as positive and negative, and the textbooks are either wholly silent on this head (*Biot, Pouillet-Müller, Baumgartner*, and others), or directly contradict one another (*Eisenlohr*, Physics, 3rd edit. p. 461; *Eydam*, Electricity and Magnetism, p. 152), one calling + M what the other sets forth as - M, and since uncertainty thus prevails over the value of both powers, it appears necessary

that I should briefly explain the reasons which determined me in my choice.

In the electro-chemical system which Berzelius introduced into natural science, and thereby gave its present form to chemistry, the voltaic zinc and copper pile is, it is well known, taken as the basis, and the electricity of the zinc pole is regarded as positive, because it agrees in its properties with those which glass rubbed with zinc amalgam presents, and which have been called positive. It is further agreed to consider all those bodies, which collect in preference around the positive pole, in the voltaic current, as electro-negative, and *vice versâ*. With this clue, I have endeavoured to investigate the *odic* properties which present themselves, on the one hand in the electro-negative, and on the other in the electro-positive bodies. The great, strongly expressed *odic* distinctions between the two, as I have made them out and detailed them in the preceding treatises, I have again perceived in a similar manner at the poles of crystals, in organic beings, in magnets, &c. A parallel has thus been distinctly evolved, to be drawn between certain properties of one pole of these natural objects, and those of the other. Those, therefore, which are parallel to the properties of the electro-negative bodies, I have assumed to be equivalent with these as to their polar value, and called od-negative, and *vice versâ*. That pole of our magnetic needles which turns to the south, and which I have everywhere denominated the southward pole, is the one which in odic respects produces the same reactions as the electro-positive bodies. This, however, is the magnetism of the north pole of the earth. Under the general hypothesis, therefore, that in the electro-chemical series, the metalloids are actually negatively electrical,—most metals, on the other hand, positively electrical,—I have been compelled to decide in favour of those who regard the north pole of the earth as positively magnetic, to indicate it as + M, and consequently

to mark all analogous odic properties with + Od. In like manner I have necessarily assumed the south pole of the earth to be negatively magnetic, indicated it by — M, and called the odic phenomena going parallel with it — Od.

Although I have declared for the electro-chemical theory now prevailing in my judgment as to the nature of the magnetic poles, and have deduced their value by conclusions from this, I am perfectly aware that the polar signification of natural bodies is still an unsettled subject, that doubts may be urged against the negativeness of the acids and the positiveness of the alkalies when we see the two in contact polarized in a directly opposite manner, &c.; in the course of my investigations also I have in many places perceived obstacles to it; but I have submitted to the generally received opinion, and in compliance with this the north pole of the globe must be called positive and the south pole negative, so long as potassium is acknowledged to be positive and oxygen negative. If, as is not altogether impossible, this should ever be altered, it will be necessary to reverse the signs throughout my work.

279. *A third* and last subject on which some preliminary remarks are requisite, is the *word Od*. There is evidently a tolerable probability that the definition of it I have laid down at § 215 includes that which Dr. Faraday a year later introduced to the scientific public as a new material force, under the name of diamagnetism. The British physicist was doubtless unaware of my researches, which have appeared in an English translation in London, or he probably would not have ignored them. Under the definition of the word Od I have comprehended the final causes of all the phenomena described by me, in so far as they have been found irreconcileable with our previous knowledge of the nature of the magnet and the other dynamics, and are in particular capable of being extended from magnetic bodies to the so-called non-magnetic, to metals, glass,

silk, water, salts, and all the rest. Diamagnetism was, indeed, discovered and made known twenty years ago by Seebeck, Munke, Buchner, and Bocquerel, which was also unknown to Dr. Faraday; and I have not met in my labours with the transverse position of freely moving non-magnetic bodies in regard to the magnetic current, and for the present a gap remains between the subjects of our labours; at the same time it is in my opinion not impossible that we are both journeying toward the same point, only by different roads. If I am not deceived by appearances, Dr. Faraday has seized one of the many odic threads, one in all cases favourable, and will help onward the question with the force of his fertile talent. This cannot be otherwise than advantageous to the progress of science. Whether magnetism, diamagnetism, and Od, shall one day prove identical, or solid distinctions shall remain between them, is a question of which the solution appears to me to lie at present at a considerable distance. In any case they collectively include totally new qualities of all dead and living matter, and from their generality and all-pervadence throughout the universe, are of the highest physical importance.

Since the interest of the subject will be increased by the clearness and distinctness of the definitions, *i. e.* by the settlement of the extent of their compass and the determination of the boundaries of their component parts, I think it opportune to insert here a condensed sketch of the distinctions which appear to me to hold between the now established allied dynamics, and that for which I have found it necessary to propose the term Od. In this manner, on the one hand, what I regard as the peculiarities of this will appear better exhibited than they have been hitherto, while on the other it will be more clearly seen, whether and what hope exists of bringing the new phenomena enumerated into already known categories, and thus eventually rendering the new word superfluous, or, whether the necessity of

establishing and maintaining it is inevitable. The distinctions,—so far, namely, as they have been made known in my earlier, and will be detailed in the present and future publications,—are as follows :—

A.—DISTINCTIONS FROM HEAT.

a. Odic emanations cause feelings of cold and warmth in all the sensitive,—indeed sometimes produce icy cold and burning heat ; that is to say, excite sensations *seemingly* like these. But when they are directed upon the thermometer, they have not the slightest influence upon it ; even Nobili's thermoscope remains motionless. Neither the cold-giving nor heat-exciting pole of a crystal affects this instrument in the least.

b. Many cases occur in which heat and Od cause diametrically opposite effects. A right hand produces a feeling of cold in the sensitive ; but it has always a reverse, heating effect, upon a delicate thermoscope. The rays of the sun produce a feeling of cold in the sensitive ; on the contrary, they warm the thermometer. Moonlight is felt distinctly warm ; but not indicated perceptibly by the thermoscope. Glowing charcoal, flame of burning bodies of all kinds, radiate a remarkable degree of cold to sensitive nerves : the thermometer, on the contrary, exhibits the effect of heating rays. Chemical combinations give rise to sensations of cold, while liberation of heat is often indicated by the thermoscope.

c. The conductivity of Od by metals surpasses all the limits of the conductivity of heat. A copper wire of considerable length, more than sixty feet, charged odically at one end, delivered variations of odic sensation at the other. A wooden rod did the same, also a glass rod, a silk ribbon, a strip of linen or cotton cloth many yards long ; bodies which are far from being capable of conducting heat in this manner.

d. Od penetrates very readily through solid bodies : the sensitive feel a crystal, a man, or a magnet, behind thick walls, in a few seconds, without being aware of their presence : the greatest heat requires many hours before it begins to be even perceptible on the other side. No one feels the sun's rays through a wall, least of all in cooling ; but the sensitive distinguish in a moment, inside a building, a wall on which the sun is shining, from another which is in the shade.

e. Concentrated odic rays are felt by the exceedingly sensitive at incredible distances ; magnets, poles of crystals, human hands, and trees, at distances of more than a hundred yards ; weak rays of heat, proceeding from bodies at the common temperature of the air, are not indicated by any instrument at such distances, and the sensitive perceive the latter just as little.

f. Neither odic heat nor odic cold alter the density or volume of bodies. Even a thermometer may be perfectly charged odically, positively warm or negatively cold, and the index will not alter in the least. Every one knows the effect of heat upon a thermometer.

g. We know already that great distinctions of odic condition exist between the different colours of the luminous spectrum, and we shall become more minutely acquainted with them in this and the succeeding treatises ; but when I caused the rays of the sun, moon, or fire, to fall at less than thirty-five degrees upon a ten-fold glass disk, and decomposed the transmitted light into an iris with the prism, the even tolerably sensitive all felt very great differences of temperature between the different colours ; thus in places where, as far as we know, no trace of free positive or negative heat can reach.

h. Metallic wires, which appear to the sensitive to glow odically, remain quite at the surrounding temperature to common sensation and the thermoscope.

i. When of two glasses of water, one was left in the shade, the other exposed for a few minutes to the sun's rays, every sensitive person distinguished that which had been subjected to the warm rays as cooler. § 105.

k. Further than this: a porcelain rod heated directly over the fire at one end, as well as a lighted stick of wood, were held in the hand by the other ends; they were felt to become much cooler by the sensitive. I shall detail this more minutely hereafter.

Heat, therefore, is, under given circumstances, a means of odic cooling. *And therefore heat must be fundamentally different from Od.*

B.—DISTINCTIONS FROM ELECTRICITY.

Odic phenomena very often occur where electrical phenomena either do not exhibit outward manifestations, or, as far as we know, do not at all exist. Under this head belong sun-light, moon-light, spectra of light transmitted through ten glass plates, crystals, hands, and in part, also, chemical processes, &c.

a. Od is distributed throughout the mass of matter; a hollow metallic sphere is seen to be pervaded with light internally as well as externally. A glass of water tastes odized throughout its mass; even when poured into another vessel, (§ 107) it remains wholly odic; free electricity lies only on the surface of bodies. Od may be transported in the inside of a chamber on to all objects, even to the air, for some time. Dr. Faraday could not accumulate electricity anywhere in a chamber especially prepared for the purpose; it all escaped immediately over the surface of it.

b. When free Od is accumulated in a body, it is retained in it in such a manner that it cannot readily be removed from it; but some time—a quarter of an hour to an hour—is required before it disappears again by contact with other

bodies ; free electricity is immediately conveyed away by contact from any charged body.

c. Od may be transmitted to unisolated bodies, and accumulated in them to a certain extent. Electricity can be conveyed and condensed only upon isolated, by no means upon unisolated bodies.

d. All bodies which possess merely continuity are almost equally good conductors of Od ; the incoherent are only somewhat worse : electricity is only conducted by metals well ; by many other bodies, badly ; by some, not at all. The transmission of Od in the best conductors, as in metallic wires, goes on slowly—twenty to forty seconds are required for a wire fifty yards long ; electricity traverses a million times longer spaces in immeasurably shorter time.

e. Permeability by Od is a character of all bodies ; slight distinctions do occur in this respect among different bodies ; but they are of little importance. Electricity, on the other hand, is arrested by a great many bodies, which are almost incapable of being penetrated by it, and oppose insuperable obstacles to its course.

f. The action of electricity upon Od takes place at much greater distances, and more strongly, than that of electricity upon electricity. A weak electrical charge from a spark of one-fifth of an inch, produces an active odic current in a metallic wire at a distance of two yards, (§ 169) where a conductor would no longer produce any observable distribution to the other.

g. The excitement of Od by electricity does not follow instantaneously, but always requires an appreciable time—often thirty seconds or more. This holds both in the production of sensations and of light. A resinous electrophorus is electrical long before the odic flame becomes visible on it. An electrified and a galvanized wire only begin to glow odically after the current has continued to flow for some time through them, or after the Leyden jar discharge

has passed some seconds. In a Schweigger's multiplier, the odic light did not appear for ten to fifteen seconds after the deflection of the needle : all manifestations and effects of electricity are instantaneous.

h. The duration of odic phenomena, on the other hand, is incomparably longer than that of electrical transmissions. When a wire rendered odically incandescent in the electrical way is brought out of the current, its luminosity endures for half or a whole minute,—nay, after strong discharge of a Leyden jar, two minutes, and then slowly dies away. In the multiplier, the magnetic needle returns from its divergence back into the meridian, a long time before the coil of wire ceases to emit odic light. Certain flaming odic phenomena in conductors, metal plates, or wire communicators, do not all begin at once, when electrified, at the moment of receiving their maximum electric charge, but after the escape has continued for some time ; when the supply ceases, the odic phenomena disappear but gradually and slowly, even from unisolated conductors ; their odic condition, however, endures for the sensitive in many cases — for instance, in water, persons, &c.—for an hour.

i. But cases of the reverse kind also occur, in which odic light disappears sooner than the excited electricity ; an electrophorus loses its odic luminosity after the rubbing with fur, after a few—perhaps ten—minutes have elapsed ; while the electrical charge of the cake lasts for days and weeks. It follows from this, that Od is indeed excited by every electrical action, but then takes its own independent course.

k. Many flaming odic appearances exhibit a constant tendency upwards, and ascend vertically : electricity does not manifest any such tendency, either when in motion or at rest.

l. Appearances of odic light of great size appearing over unisolated electrified metal plates, do not adhere to the metal, but flow over it, like the aurora over the earth :

electric currents always remain close upon the metal, wherever it comes in their way. The experiments affording this axiom will be given in the next treatise.

m. Effluences of Od are not exclusively confined to points where these are at hand, but rise out of the sides even of toothed bodies ; this is the case even in large crystals. In similar cases, electricity never flows but from the points. In the hydro-electric chain, all the elements diffuse light and sensations of Od : in its electric currents, we are only aware of the internal activity and complete circumscription of the electric circuit when the chain is closed.

n. Odic currents exhibit a remarkable degree of independence of electricity, even when excited by that agent ; the isolated metal plates on which the two appear together may be grasped in the hand, or electrified wires may be allowed to lie loosely and touch the ground, without alteration of the streams of odic light, while the electric currents are thereby diverted in totally different directions.

o. Odic flames, from whatsoever bodies they issue, positive or negative, exhibit no tendency to unite or neutralize each other when approximated ; when they cross, they go on together ; when they are brought into diametrical opposition, they repulse one another. (See *infra*, § 401.) Unlike electricities neutralize each other with violent attraction.

p. Influence and induction, which produce such remarkable effects in electricity, I have hitherto never been able to detect with certainty in odic phenomena.

q. Electrical tourmaline, like every other crystal, vividly excites the sensitive with its poles ; but is not altered by warming, does not become stronger, and the electricity thereby excited is not perceptibly felt.

r. Perhaps the most striking thing is the contrast between the violent effect of the Od upon the excitability of sensitive persons, and the insensibility which the same show to electrical effects, and which is such that even the highly sensitive

do not feel them more than the healthy. Hydro-electrical and frictional electrical currents, or the discharge of the Leyden jar, are borne by them as easily as by any other person. Stroking a cat, the approach of a thunderstorm, the tricks played with an isolating stool, are agreeable to many of them.

All this manifests that the gap which separates Od from electricity is very great.

C.—DISTINCTION FROM MAGNETISM.

Od is formed, or manifested vividly, in a number of cases in which magnetism never gives evidence of its presence, or is yet unknown to us; in many chemical processes, in vitality, in crystals, in friction, in the spectra of sun, moon, and candle-light, in polarized light, and in the amorphous material world in general.

a. Development of Od occurs independently and without magnetism in the majority of cases: magnetism never occurs alone, but always associated with Od.

b. In things where magnetism appears to give token of its presence, but as yet is not uncontestedly admitted by science to reside, as in the rays of the sun and in moonlight, it is manifested in a so extremely weak degree, that its presence is still highly doubtful; but in these very cases Od appears with a force and a variety of effects which are quite astonishing, and seems capable, in particular instances, of shaking the very foundations of life.

c. The interposition of a mist or cloud before the light of the sun or moon at once weakens their effects upon the sensitive very considerably: magnetism is not restrained by anything—least of all by vapour.

d. The transfer of Od may be effected in an exactly homologous manner upon all solid and fluid matter; metals, steel, salts, glass, milk, resin, water, may all, with slight distinctions, be charged with Od: magnetism can only

be conveyed to a certain few bodies ; nothing, however, is yet known concerning the transferability of diamagnetism.

e. When things of that kind are charged with Od, they react upon the sensitive exactly in the same way as the magnet : but not the least perceptible trace of magnetism resides in them ; iron is not attracted, even in the shape of filings, &c.

f. The coercive power over Od has been observed in steel for at most something under an hour ; therefore not for much longer than in water, iron, &c. But for magnetism, it is enduring for many years, while it is quite indiscernible in water, iron, &c. Thus magnetism remains in steel ; Od cannot persist in it by itself, but disappears.

g. Od is also conductible by substances like resin, glass, wood, silk strings, cotton bands, &c., to the distance of many yards. We know of nothing similar in the magnet.

h. Od may be conducted many yards on a long iron wire, and made perceptible to the sensitive (§ 47, 118) : an iron wire about sixteen yards long and one-twelfth of an inch thick, stretched in the *parallels*, and put in contact with the northward pole of a nine-layer horse-shoe magnet, did not exhibit to me, at the other end, any trace of magnetic reaction.

i. The distance of action for Od of the diffusing bodies—such as hands, crystals, or electrified bodies, reaches at least as far as with magnetic bars of the same size ; in many cases farther. I have tested and compared both to a distance of 160 feet through the air. We know of nothing at all like this, in regard to distances of effective action of such magnets in exerting magnetic influences.

k. Emanations of Od are found to be subject to a kind of refraction, at least certainly in the cases in which they are accompanied by rays of light. I have already shown, and in a subsequent treatise shall make known

many new, certainly very remarkable observations, in which I have found that while a glass prism separates colours, it also produces similar divisions in Od, which, with the rays of light, is subject to refraction by the glass. And since it so completely accompanies light, that in each colour of the spectrum appears a different (if I may so express myself) odic colour, it is clear that the rays of Od are refracted simultaneously and exactly with the rays of light; consequently, that odic emanations, whatever they consist of, are refrangible by glass, like the rays of light. But this property is wholly wanting in magnetism, which is not arrested by anything, and cannot be deflected, as Haldat has recently shown us convincingly by means of his magnetic measuring instrument. He expressly asserts that emissions of magnetism from bodies are neither refracted nor reflected. (*L'Institut*, May 27, 1846, p. 647.)

l. The distribution of Od in bodies is demonstrated, for example, in water, to be effected throughout the mass; magnetized water may be poured from one glass into another, and when drunk is found to be all equally strongly odized up to the last drops; odically luminous metals appear to be translucent, and to glow through and through; odized hollow spheres manifest strong expressions of odic action in their interior: but magnetism, according to Barlow's researches, is restricted exclusively to the surface of bodies.

m. It is found, and will be explained at length hereafter, that Od diffuses around itself spherical zones of alternating opposed polarities, similar to electricity: nothing of this kind has ever been observed in the magnet.

n. Od has no attraction for, or power of supporting iron, not even the smallest filing. The most striking effect of the magnet consists in this very mighty power. But in regard to odic capabilities, crystals and hands of equal size with the magnet are not only equal to it, but frequently surpass it in strength, especially the latter.

o. Suspended odic bodies do not acquire any particular direction from the influence of terrestrial magnetism ; but it turns magnetic bodies into the meridian, &c.

p. In the inorganic kingdom, the flames of the Od-poles exhibit no measurable attraction toward each other ; poles of magnets, however, and their lines of force, reciprocally, the most powerful. The odic flames, even when they blaze forth side by side from the poles of a horse-shoe magnet, display no attraction ; nay, even when the unlike polar flames are directed immediately toward one another, not only are they not attracted when brought close, but are even mutually repelled at the places where they are forced to meet. This is directly contradictory to all we know of magnetism.

q. When the two arms of a horse-shoe magnet are both placed in a horizontal direction, the odic flame also flows straight out from them, but it then ascends upwards in an arc from both poles : no such tendency has ever been perceived in magnetism.

r. A certain amount of odic flame still flows from the magnetic poles of a horse-shoe (*vide infra*, § 458) after the poles have been long rendered magnetically indifferent externally, by the application of the armature : the magnetic efflux is stopped, but the odic persists still, although weakened.

s. Even when two strong unlike magnetic poles are joined, § 401, 402, 404, 405, retain and neutralize each other, an emanation of odic flames nevertheless persists uninterruptedly, although rendered weaker.

t. Magnets brought into the electrical atmosphere of the conductor may have their odic polarity reversed, while the magnetic remains quite unaltered. Electricity thus exerts a power over the former, which it in no case possesses over the latter. (*Vide infra*, § 373, 436.)

u. The appearance of Od and that of magnetism never

occur simultaneously in their production. When a galvanic current acts upon a multiplier or a rotating apparatus, the reaction on the magnetic bar is instantaneous: the odic luminosity and the effects upon the sense of feeling do not appear until after the lapse of several seconds, and the more slowly and later, the longer the conducting wires are. The same is the case with the cessation; the magnetic reaction ceases immediately on the interruption of the galvanic current, but the odic effects last a good while longer.

v. When a crystal, a finger, or a rod dipping in any chemically-acting substances, is placed within a wire coil, no induction is caused, even when these bodies are much larger and more odically potent, much stronger in emanation of light and excitation of sensations, than a magnetic bar; this last may be ten times smaller and a hundred times odically weaker, and yet will instantaneously induce a current in the wire coil. (Vide § 40.)

w. When a magnetic bar is held in the hand in such a manner that the magnetic pole of the same name as the odic polarity of the hand is outwards, its odic flames and odic force increase; but it does not support a grain more iron on that account. Exactly the same, *mutatis mutandis*, is caused in magnetic bars by the poles of crystals. The magnetic bar gains Od from the odic hand or crystal pole, but it does not receive the least accession of magnetism. (Vide *infra*, § 442 and 444.)

x. The above-mentioned influence may go so far that the odic force of the bar may be even reversed, while the magnetic polarity remains altogether unaffected. When a weak magnetic bar is grasped by the southward pole in the left hand, the projecting northward pole not only loses its blue negative flame, but a red positive one immediately begins to issue from it, while its negative magnetic character remains unaltered. (Vide *infra*, § 446.)

y. In the course of these treatises, we shall become acquainted with remarkable cases where the odic flames of magnets are extinguished by the approximation of organized living beings; their magnetic force is not in the least changed by this. (*Vide infra*, § 448.)

z. The moon also affords a beautiful proof of the distinction between magnetism and Od. I have shown in an earlier treatise, § 119, that the moon acts od-positively upon all the sensitive. On the other hand, M. Kreil, the Prague astronomer, distinguished for his scientific discoveries, informs us in the first volume of his *Astronomico-meteorological Year-book*, p. 104, that the moon exerts an attraction on the southward pole of the magnetic needle, consequently must have, on the side turned towards us, the magnetism of the south pole of the earth, and this, according to my rule of deduction, is negative magnetism. This looks like a contradiction when superficially considered, but is solved by more accurate examination. For the magnetic effect which the moon exerts on the needle is so weak, that it can only be detected by observations like those of a physicist as accurate as M. Kreil; but it is not nearly strong enough to react perceptibly on moderately and healthy sensitive persons. Now all the sensitive feel the moon od-positive, and this very vividly. It is the rays of light of the moon that produce the active effects we meet with. This is proved most clearly by the circumstance, that the effects of the moon upon the sensitive may be in great part removed by keeping away the direct radiation or the reflection of the rays, by good window shutters; magnetic influence, which penetrates everything, could not be turned away by intercepting the rays. Thus, in spite of the fact that the half of the moon turned towards us has been proved to be negatively magnetic, it nevertheless diffuses abundance of positive Od to the earth.

a a. Of diamagnetism we at present know only the repul-

sions, which, from Haldat's observations, may in the end range themselves with the true magnetic phenomena.

b b. But the distinction between Od and magnetism comes to light most strikingly in the following experiment : —Let an iron rod of about twenty inches long be fixed in a wooden holder of any kind, which shall be attached to its axis. When this is so directed that it lies horizontally in the magnetic meridian, every sensitive person feels its northward end cool, its southward end tepidly warm. If the northward end be declined till it be placed in the magnetic dip, *i. e.* if the rod be turned till its temporary northward end make an angle of about 65° with the horizon, it then will attain its maximum magnetic condition ; the coolness of its northward pole should in like manner increase to its greatest height, the southward pole also in warmth. But, instead of this, we find *exactly the opposite*. The magnetic northward pole now becomes odically warm, the magnetically southward pole odically cold. Od and magnetism, which otherwise proceed side by side in a certain parallelism of manifestations, here meet diametrically opposed, *the negatively magnetic northward pole is od-positive, the positively magnetic southward pole is od-negative,—under the circumstances here introduced; the two follow directly contrary paths.*

c c. We shall meet below with cases where superimposed layers of steel of like magnetism are reversed one above the other ; so that, while all possess one kind of magnetism, there occurs an alternation of positive and negative odic layers. This may be strengthened by approximation of crystals and hands, but is removed by that of magnet poles. (Vide § 340 and 344.)

d d. We shall actually meet further on with an experiment in which positive magnetism and emanations of negative odic light occurred simultaneously in a particular element

of the arms of a horse-shoe while passing over another magnet. (§ 433.)

Therefore, at present the identity of Od and magnetism is altogether out of the question.

Consequently, the distinctions which exist between heat, electricity, magnetism, and Od, have not merely remained undiminished by the ulterior researches continued since § 276, but have rather made themselves more strongly manifest ; and they will become still more so in the following treatises. They are expressed so definitely and clearly in many points, that the necessity of a special terminology appears more inevitable than ever. *Under the definition of the word Od I include all the physical phenomena presenting themselves in these researches, which cannot be brought under the definition of the dynamics hitherto acknowledged, together with the vis OCCULTA, on which they depend.* Whether, and to what extent, they will, in the course of time, be distributed and transferred into the provinces of the latter, remain questions for future research, and are deferred till the acquirement of a deeper insight into the essence of these things.

Every one is almost convinced that electricity and magnetism are of one nature ; no one doubts that here essential force of one kind acts on the one side in a half-free, on the other, half-confined condition ; we are all in hourly expectation of the approaching discovery, through which their identity shall be demonstrated, and the two be made capable of comprehension under a common definition : yet we shall never be able to dispense with either of these words. In the same way it will happen with the word Od, or any other that it may be agreed to receive in its place ; it will be necessary, in order to comprehend a certain complication of phenomena, which cannot be otherwise registered than as a special group.

EIGHTH TREATISE.

LUMINOUS PHENOMENA.

The Odic Luminous Phenomena on the Magnet.

280. I COMMENCED the present series of treatises with the most striking of the luminous phenomena—those of the magnet; those of crystals followed; then I made known those of certain human organs, such as the hands; and thus I proceeded onward to those of the heavenly bodies, heat, friction, light, electricity, of chemism, and finally of matter in general. In all these cases, however, I have only made mention of them *generally*, in so far as I endeavoured to obtain signs of the existence and activity of Od, and could establish these through the evidence of the existence of the luminous phenomena. I have confined myself to this in all places, and reserved a discussion of the latter *in particular* for a special treatise. Such will be the object of this, the eighth, and the succeeding essays, and I thus perform the promise made in § 55 and § 93.

281. Hitherto, in the many cases mentioned, I have only reported the sensuous perceptions on which the detection of the odic light depends, as derived from the statements of the highly sensitive; the following pages will show, however, that it is by no means only these who detect it, but that the odic light presents itself in innumerable cases so distinctly and prominently, that not merely also the slightly sensitive, but, *what now becomes of the greatest importance, a large number of PERFECTLY HEALTHY PERSONS, are capable of seeing it.*

282. I shall now in the first place give the physical fact,

the existence of the odic light, new and more extensive confirmation by a great addition of observed cases; then examine these more closely in the different forms of their occurrence; compare their relations both with each other and with allied natural phenomena; deduce certain new laws for Od from them; and from all this seek to make out some fixed points for establishing its place in the domain of physics.

HISTORICAL ESTABLISHMENT OF THE FACT OF ODIC LIGHT ON MAGNETS IN GENERAL.

283. In the earlier treatises it was shown that the odic light was perceived by all the highly sensitive, without exception, who were included within the sphere of my investigations, and thus its actual existence established and placed beyond reasonable doubt, by a series of testimonies agreeing in all essential particulars. It was further demonstrated that the different degrees of strength in which different persons saw it, depended on the varying conditions of disease of the observers, and finally that in one and the same observer, different stages of diseased condition caused a different degree of sensuous receptivity, and thereby a different appreciation of the impression of the light upon the senses. This must be clearly understood. Miss Nowotny, when nearly well, no longer saw any light, even on the strongest magnet (§ 3). Some days earlier, when her recovery was not so far advanced, she still saw momentary flashes, disappearing immediately, when the armature was removed from a magnet in the dark. Two days before this, she had seen a luminous thread along the edges of the steel, and a week previously, a beautiful shining flame at each pole of the open magnet, the ray-like emanations of which were from three quarters of an inch to one inch and a quarter long. Miss Sturmann (§ 4) saw the flames of the same magnet about four inches in length, thus

more than three times as long. Miss Reichel drew me these, from her observations, of the length of the arm of the horse-shoe, that is, twelve inches long. Miss Maix (§ 6), in her usual condition, saw them only a hand's breadth, but whenever she was seized with an attack of spasms, the same magnet appeared to her wholly enveloped in fire, and the flame in places several spans long. Miss Reichel (§ 7) saw the magnet in moderate obscurity, not merely emit flames from the poles as long as the arms of the horse-shoe, but also a delicate light spread all over the magnet, and this latter even while the armature remained applied. But Miss Atzmannsdorfer (§ 13) told me that the flame of my large nine-layered magnet attained almost the size of a man in her eyes when it was very dark, so that she frequently saw herself wholly enveloped in it, as if she were being burnt. She saw both this and smaller magnets enveloped between and around the arms by delicate down-like flame; the poles, each flaming, especially at its four corners, in blue and red, yellow and green intermingled, and each layer of the compound magnet possessing its own lateral flames (like § 9). Bar magnets always flamed more strongly at the northward pole than at the southward in this case.

284. These observations all belong to the year 1844. I collected a much greater number of them in the years 1845, 1846, and 1847, during which I devoted myself with unceasing efforts to the pursuit of this attractive subject. Those of the results simply serving to the further confirmation and establishment of the fact of the existence of the odic light over the magnet, I subjoin here seriatim. I remark, however, expressly, that this is done chiefly for those readers whom the previously reported observations do not suffice to convince, and who consider a greater number of testimonies necessary for the establishment of the physical phenomena of the diffusion of light from the magnet; all those, on the contrary, who are satisfied by what has already been brought

forward, and who consider the accuracy of my mode of investigation sufficient, can, without any great loss, pass over these, and turn from here immediately to § 334, where, leaving behind all the concrete cases and specialities, they will arrive immediately at the conclusions deduced from them.

I follow the order of rising from the weakest powers of vision to the strongest, proceeding from the healthy sensitive to the sickly, and ending with the permanently diseased, highly sensitive persons.

a. *Healthy Sensitives.*

285. Among these I met with a few who possessed the odic feeling very strongly marked, but were unable to recognise the magnetic light ; others who saw it weakly ; lastly, some who saw it with greater facility, and with a clearness and distinctness which excelled not only that of many invalids, *but even of actual somnambulists.*

286. Dr. Friedrich, from Munich, a young, healthy physician, from whom I learnt that he was sometimes subject to walking in his sleep, had the kindness to allow me a trial, and to place himself in my own dark chamber prepared for these researches. I found him distinctly sensitive, but in a weak degree ; he saw other objects emit light, but never magnets.

287. M. Edward Hütter, bookseller, grandson of Anton Doll, in Vienna, a fine, young, and perfectly healthy man, was excitable in many ways to the odic sensations, but had no power of seeing the magnetic luminosity beyond a weak and uncertain appearance on a small, strong, horse-shoe magnet, in the dark.

288. Maximilian Krüger, a boy of twelve years, in the Orphan Asylum at Vienna, sensitive to a considerable degree to the impressions of the odic feeling, was unable to detect any impression of magnetic light in the dark.

289. Mr. Carl Rössner, Imperial Counsellor and Professor of Architecture in the Academy of the Plastic Arts, at Vienna, forty-two years of age, remarkably sensitive to all impressions on the feeling that can be excited by *odic* influence, could not detect a trace of luminous appearances during three hours which he was kind enough to devote to me in my darkened chamber.

I met with the like frequently, especially in men; most remarkably in Dr. Diesing, Keeper of the Imperial Museum of Natural History in Vienna. Although very highly sensitive to all impressions on the feeling, he was totally insensible to luminous phenomena of all kinds in the dark, where he remained for four hours.

We thus have here five decided sensitives in whom the light which issues from the magnet could not be brought to evidence. This warrants our concluding that the sensitiveness is not always necessarily connected with the power of seeing and perceiving the magnetic light. These cases are undoubtedly the rarer.

290. Mention has already been made frequently of Mr. C. Schuh, in speaking of sensitive perceptions of feeling; he stands on the outermost limit in the luminous phenomena; he does not see the magnet flames, but he distinctly recognises the shape of horse-shoes and magnets in complete darkness, and thus sees weakly the emanations of light from the magnetic metal itself. This is what I have called the *odic incandescence*, and constitutes the first degree of perception of light.

291. Mr. Hubert von Rainer, of Klagenfurt, twenty-four years old, barrister, a man of exuberant health and strength, has never been ill, and knows neither head-ache nor disorder of the stomach. His sensitiveness in the sphere of feeling is strongly marked, but he only detected the magnetic light with certainty when I pulled off the armature

from the horse-shoe, whereupon he saw a flash at the moment of separation.

292. Dr. Ragsky, Professor of Chemistry in the Joseph Medico-Chirurgical Academy at Vienna, a very healthy, unusually tall and powerful man, thirty-two years old, exhibited every sensitive excitability. He did not see a bar magnet in the dark, but he saw horse-shoes, if they were single and strong, so far towards the poles, that he was able to distinguish the shape of the steel. With intermissions, he detected appearances of blue light at the northward pole, at the southward pole nothing.

293. *a.* Dr. Huss, Professor in the Hospital at Stockholm, Physician to the King of Sweden, saw only the more powerful phenomena of odic light in the dark chamber, but not common magnets. Yet when I placed before him a strong electro-magnet, with a Smee's battery of some 400 square inches of zinc and silver surface, he perceived at one of the two poles, the negative, the formation of a pale light, which developed abundance of smoke, ascending upwards like a cloud.

293. *b.* Hermine Fenzl, eight years of age, the daughter of Dr. Ed. Fenzl, Chief of the Botanical Department of the Imperial Museum of Natural History at Vienna, a child of slender make and active mind, healthy and gay, showed strongly all the reactions of sensitiveness to feeling; but she did not perceive the luminous phenomena in the dark so well. She saw three large and one small horse-shoe magnets emit gray light, the last most brightly; she described the northward pole as more strongly luminous than the southward. Of bars, she saw only some three-fourths of an inch long, illuminated, others eight inches long she did not perceive. She could not detect flames or smoke. She did not see brightness of any kind on larger magnets.

294. Baroness Isabella von Tessedik, the young widow

of Mr. Franz von Tessedik, of Pesth, a mother, of calm temperament, a lady of remarkably intellectual cultivation, saw a magnetic rod twenty-eight inches long, and all horse-shoe magnets with the steel weakly luminous, so that she could distinguish their figures, glowing odically, in the obscurity of the dark chamber. She saw a one-layered, a three-layered, and a nine-layered horse-shoe, furnished with a luminous cloud four to eight inches long on each pole. She detected the same on a horse-shoe electro-magnet. On this, however, and some other horse-shoe magnets, she could only perceive the luminous vapour on the northward pole. She saw the magnetic light more brightly when I pulled the armature off quickly ; this caused a momentary flash, like lightning.

295. Mr. Constantine Delhez, forty years old, a French philologist, at present residing in Vienna, healthy but distinctly sensitive, saw, after a sojourn of an hour and a half in the dark chamber, magnetic rods glowing, and a one-, a three-, and a five-fold horse-shoe, emit lights from one-third of an inch to four inches long from the open poles ; from a nine-fold horse-shoe they rose more than twenty inches ; from an electro-magnet they attained almost forty inches ; and both produced illuminated spots on the ceiling more than forty inches in diameter. Both the appearances of odic incandescence upon the steel magnets, and the flame-like emanations flowing from the poles, always seemed to him somewhat vapourous, as is described by all the sensitive of inferior degrees of excitability.

296. Our revered Consistorial counsellor and Superintendent of the Evangelical Communion in Vienna, Mr. Ernst Pauer, to whose congregation I and my family belong, of tall and imposing form, but of delicate make, fifty-four years of age, whose sensitiveness is especially strongly marked in the effects on the feeling, saw all magnets luminous all over the metal : on some of the smaller, the flashes when I removed

the armature, and emanations of odic light from the poles of small bars, as well as particular horse-shoes ; in some only from the northward pole, in a five-fold horse-shoe from both poles, stronger at the negative and weaker at the positive. He saw an electro-magnet furnished with pale lights over both poles, two inches high and of the same breadth.

297. Baroness Pauline von Natorp, of Vienna, mother of two children, young and intelligent, blonde, saw the flashing lights of small horse-shoes when the armatures were taken off, and the permanent light on the northward arm. On larger magnets, she sometimes saw the light only of one, always the northward, arm, sometimes of both, as a luminous cloud almost four inches long. On larger magnets of relatively weaker intensity she saw only a weakly illuminated delicate vapour over the poles.

298. Mr. Demeter Tirká, a Greek merchant in Vienna, forty years old, distinguished for his love of objects of plastic art, of powerful build, and, with the exception of occasional head-aches, healthy all his life, saw light flash from a small and a large horse-shoe when I pulled off the armatures, each time over the northward pole ; he saw a permanent light over the same pole of a three-fold horse-shoe, but nothing on the southward pole. He saw no distinct flaming on a heavy nine-fold horse-shoe, but he perceived all objects in the immediate vicinity to be illuminated by it.

299. Mrs. Sylvia von Varady, wife of the Imperial counsellor Mr. von Varady, a young, blooming lady, lively, healthy, of Italian family, saw all rods and horse-shoes dully luminous in the dark. She saw a one-fold horse-shoe emit vaporous lights two inches long, and the nine-fold horse-shoe five feet high over the poles, when the armature was removed. Strongly magnetic rods of eight inches in length bore lights on their poles three quarters of an inch long.

300. Mr. Theodore Kotschy, evangelical minister, the botanist, the renowned and vigorous traveller through

Africa and Asia, of whom mention has been made already in §§ 80, 191, 222, 232, saw flashing flames, which soon disappeared, on the northward pole of simple horse-shoes when the armature was pulled off. On three-fold ones he saw thin, vapourous lights blaze continuously, one to two inches high ; when I applied the armature and pulled it off again, they flashed up brighter for a moment, but sank again directly to their previous permanent state. A nine-fold horse-shoe he did not see at first, but soon recognised an extremely thin, widely diffused luminosity over the open arms, playing over them, more than sixteen inches broad and almost forty high. He did not find it like a flame, but like an extremely delicate glimmering of light in the general darkness. He saw a small pocket horse-shoe more brightly and distinctly endowed with light than the nine-fold ; its magnetism had greater intensity. He saw light only on the northward pole of a three-fold horse-shoe.

301. Miss Ernestine Anschütz, daughter of our celebrated court actor Mr. Anschütz, a young lady of quiet and reserved disposition, at present perfectly healthy, but in her earlier years occasionally suffering from spasms and headache, saw the steel substance of all magnets weakly luminous. On the poles of two magnetic needles, each four inches long, she saw flames on the one side yellowish, on the other bluish, but mere incandescence along their steel substance, more weak in the middle, stronger towards each pole. Of the poles of a pocket horse-shoe she saw the northward pole furnished with a delicate flame more than one inch long, on the southward pole nothing. A five-fold horse-shoe she saw with flames of a finger's length on both poles, that on the positive side yellowish, that on the negative bluish. She also perceived a nine-fold horse-shoe to be furnished at both poles with delicate emanations of light, which were from twelve to sixteen inches long, one a little shorter and yellowish, the other larger, and rather bluish or greyish.

302. Mrs. Josephine Fenzl, wife of our botanist, known throughout Europe by his literary labours, the already named Dr. Fenzl, a young mother of several children, healthy and blooming, saw a magnetic rod twenty-four inches long glowing odically in the dark chamber, and emitting flames at both ends. She described a one-fold, a three-fold, a five-fold, and a nine-fold horse-shoe as luminous and giving out luminous vapour in different degrees. Some months later, she saw a nine-fold horse-shoe flame twenty inches high, and luminous smoke rise half the height of the chamber above it. At the same time she described smaller and larger rods as odically incandescent, and furnished with polar flames, those of the northward pole longer, duller, and bluish, those of the southward pole shorter, brighter, and yellowish-red.

303. Mr. Franz Fernolendt, from Transylvania, proprietor of a chemical manufactory in Vienna, residing at 825, in the Kumpfgasse, 54 years old, perceived the magnet less by its odic incandescence than by its polar flames. He saw very few of them glowing brightly, only the small rods and a pocket horse-shoe; but on the other hand, he saw a bright cloud over all, which appeared to him as a light glare sweeping over the poles. Sometimes he saw a flame flash up when I pulled off the armature. He perceived the streaming brightness over a one-fold horse-shoe, a three-fold and a five-fold, but always either exclusively upon the north pole, or else more distinctly than upon the south, and frequently in the form of a grey cloud. On a large nine-fold horse-shoe he perceived the issuing light twenty inches high; but when I acted upon its emanations by the approximation of a positive electrical atmosphere, he saw a mass of odic light rise up gradually over it, ascending with a thickness equalling a man's body, up to the ceiling of the room.

304. Mr. W. Hochstetter, son of Professor Hochstetter, of Esslingen, in Wirtemburg, (the distinguished botanist pre-

siding over the “*Unio Itineraria*”), twenty-one years of age, engaged in the study of horticulture in the Imperial Gardens at Schönbrunn, of very florid aspect, moving about all day in the open air, saw all magnets, down to the smallest bar, odically incandescent in the darkened chamber. He saw the flames issue from the poles, not like flames, but as a luminous halo, only from rather less to rather more than an inch long from the smaller, and increasing with their size, till, on the nine-fold horse-shoe, they attained a length of twenty inches. These lights he saw larger and brighter on all the northward poles of bars and horse-shoes ; at the southward, sometimes very small and dull, and scarcely visible ; but always accompanied by abundance of smoke.

305. Mr. Nicolas Rabe, about forty years of age, a higher official in the Imperial Magazine of Mining Products at Vienna, who, throughout his life, has been perfectly healthy, vigorous, and of lively, cheerful, and warm temperament, discerned the metallic substance of all magnets laid before him in the dark, by a delicate luminosity, more especially the horse-shoes, while their armatures remained applied. From a magnet bar, he saw lights issue from both poles ; he saw a magnetic rod about five feet long furnished at the northward pole with a flame twenty inches long, the southward with one of twelve ; the extremities of these passing into a luminous vapour, which was stronger and thicker at the positive pole than at the negative. He saw all horse-shoes flame at both poles, after the removal of the armature, more strongly or weakly according to the intensity of their magnetism. The ends of the flames always lost themselves above in a luminous, smoke-like vapour, which ascended slowly upwards.

306. Johann Klaiber, cabinet-maker, whose name has already been mentioned in the earlier treatises (§§ 50, 191) on the odic sensations, distinguished a magnet laid before him by a brightness extending through the whole mass of

the steel. A long horse-shoe, too weakly magnetic to support its own weight, appeared to him to possess a scarcely perceptible luminosity, hardly connected with the northward pole, but discernible about four inches above, as if waving gently over it. Other witnesses have perceived the like, of which I shall give the details hereafter. A three-fold horse-shoe seemed to him to have a pale bluish flame on the northward pole, of variable size, sometimes about an inch, sometimes full four inches long, changing with the receptivity of the observer. The end was always lost in luminous odic vapour, intermingled with isolated brilliant little sparks. The southward pole he saw sometimes wholly without flames; sometimes with but a weak light, alternately appearing and vanishing. A nine-fold horse-shoe did not appear at all luminous to him at the poles, at the first moment, when quite close to it; but when he drew back a step, he discerned that it glowed odically, and that luminous appearances blazed up over it to the distance of an arm's length, issuing from both poles, coming to a point above, mostly as a blue flame, passing into a broad slightly luminous vapour, which rolled upward in the air, carrying with it many isolated sparks, which were soon extinguished.

307. Mrs. Eleanore von Peichich-Zimanyi, the young widow of the Imperial Secretary of State, Mr. von Peichich, of Hungarian family, really healthy, but with rather weak nerves and excitable, detected the odic incandescence of all magnets: bars eight inches long emitted vaporous light two inches in length; horse-shoes of a single layer displayed to her emanations of light as long as one's hand from the northward pole; half as long from the southward. A nine-fold horse-shoe emitted light, more than forty inches long, from the northward pole. In all cases the northward pole seemed to her to have stronger flames than the southward, usually double the size. The removal of the armature produced a momentarily stronger flash of the light. The poles

of all horse-shoes appeared to her to have stronger light than those of bars.

308. Stephan Kollar, son of the keeper of the Imperial Museum of Natural History, Mr. F. Kollar, fourteen years old, slender, lively, healthy, often restless in the night, and a talker in his sleep, saw all bar magnets, horse-shoes, and electro-magnets odically incandescent, and furnished with flaming lights, stronger at the northward pole, the weakest about three-quarters of an inch long, the large and strong twenty inches and more. These terminated in clouds of smoky vapour ascending upwards. The investigations were made in the presence of his father.

309. Miss Sophie Pauer, daughter of the Superintendent above mentioned, who was kind enough to be present at the experiments, is very young, and in perfect health, tall and slender, and of sensitive temperament. She was good enough to devote herself to the repetition of these researches several times, at intervals of a few months. When, after allowing sufficient time for her eyes to become accustomed to the darkness, I placed before her a row of magnets, the horse-shoes among them being still closed by their armatures, she saw them in their natural form and luminous; *i. e.* odically incandescent, and she expressed pleasure at the peculiarly delicate beauty of the appearance. As I removed the armatures one after another, she saw the odic flames blaze up over the poles, and always stronger, larger and brighter at the northward than at the southward poles. The flames always became brighter when I pulled off the armature, and then returned back to their constant magnitude. They appeared to her one and a quarter, two and a half, four, and eight inches long, according to the different strength of the bar and horse-shoe magnets. She saw the nine-fold horse-shoe with flames twenty inches high, and above these a delicate vaporous column rising up to the ceiling of the room, the northward pole having a blue, the southward a

reddish-yellow flame. She found a pocket horse-shoe glow most intensely when it lay upon her extended hand, its light being strengthened by her own odic force.

310. Dr. Endlicher, Professor of Botany, Director of the Botanical Garden of Vienna, forty-three years of age, so well known and celebrated throughout Europe as a naturalist that I need say no more of him or speak of his fitness for physiological researches, favoured me with his presence for some hours in my darkened chamber. He saw, besides the light which parts of the human body, organs of plants, crystals and amorphous substances, gave out abundantly and distinctly, whitish luminosity of magnetic bars eight inches long, and elongated flames issuing from both the poles ; he also saw one-fold, three-fold, and five-fold horse-shoes surrounded by a halo of light as long as they remained closed, and when opened emitting vapourous flames two to four inches long from both poles ; while the nine-fold horse-shoe, turned upwards, sent out streams of light which were almost forty inches high, and produced a light spot upon the ceiling of the room. He saw the same in a larger and stronger degree from the poles of a strong electro-magnet ; viz. forty inches high, brilliantly coloured, stronger from the northward than the southward pole, and producing a bright circle of greater extent upon the ceiling.

311. Mr. Gustav Anschütz, painter, of Vienna, residing in his own house, No. 268, Ferdinandsgasse, in the suburb of Wieden, was the first sensitive in whom I discovered that even perfectly healthy persons were capable of seeing the odic light. This was a great and unexpected discovery for my researches, and for the position of the subject in the domain of physics, attacked by such a variety of adversaries. From this moment the chain was loosened which had hitherto bound me to the diseased ; no one could now obstinately regard sensitiveness altogether as a natural phenomenon dependent either mediately or immediately upon somnam-

bulism, whatever I might say to the contrary ; it overcame the often-heard, untenable objection, that no faith was to be placed in the statements of diseased persons,—as if every one became ripe for the mad-house directly sickness attacked him ! Now Mr. Anschütz entered the circle, a healthy, vigorous man, of 35 years, thoroughly inured by a thousand hard marches and dangers during his former military life, who had never suffered from real illness, of moderate stature, rather fair than dark, very muscular, a distinguished gymnasiast, of lively and excitable, but sensitive and sympathetic temperament, and completely an artist by nature. I found every form of well-marked sensitiveness in him; and he was the point of departure from which, in my odic researches, leaving the diseased, I turned toward the healthysensitive, whom I then met with in such abundance in all directions, that I was enabled to dispense altogether with the sick, and to solve the physical questions of sensitiveness with the healthy alone. After remaining about an hour in perfect darkness, Mr. Anschütz saw all the odic luminous phenomena as clearly and accurately as any diseased sensitive. I shall return to this in all the categories, but here only make use of what he told me respecting the magnetic light. He saw all steel magnets in a whitish-gray odic incandescence in the blackness of the general obscurity, especially at the edges, and more distinctly towards the poles than toward the axes of the magnets. He found on two magnetic needles four inches long, luminous emanations at the poles. He saw all horse-shoes emit light from the poles after the removal of the armatures, sometimes from one alone, the northward, sometimes from both ; in which case the southward pole always appeared weaker, smaller, and duller, sometimes with only little luminous specks seeming to lie upon the very poles, visible at one time, and then vanishing again from his eyes. Magnets which I had brought to his residence and left with him for some

time for observation, all appeared luminous to him in less complete darkness than was afforded by my darkened chamber. He saw both a pocket horse-shoe and a three-fold magnet never flame but at one pole,—the flame not constant, but appearing to increase strongly every now and then, and disappearing again : after a half or whole minute's intermittence it again emerged from the darkness, became large, then small again, sometimes concentrated, at others resembling a large light cloud. The cause of these variations is wholly subjective, and I shall explain them further on. The nine-fold horse-shoe appeared to him only to have a luminous cloud on its northward pole, in the imperfect darkness. But this does not exhaust the interest that attaches the reader and myself to Mr. Anschütz. He is a painter. In him was the right man found, not merely to relate and describe what he saw, but capable of what no one else was,—namely, of reproducing for us in forms and colours what he saw, and placing before our eyes a picture of that which, from our want of vision, we longed in vain to see ourselves. One morning that I visited him, he surprised me with a black picture : at the first moment I saw nothing in it, in the light in which he exhibited it to me ; but when he turned it, a cloudy figure rose delicately and phantom-like from the darkness : it was the face of his beautiful wife, as it had appeared to him in its odic light in deep darkness. It was surrounded by crystals, magnets, flowers, and bands, and I saw before me a picture of natural phenomena such as human eyes had never met before. The delight which I felt with this I try to convey to the reader by giving a representation of this remarkable picture in the Plate opposite. Unfortunately, no art of the printer is capable of giving more than an approximation to such an extremely delicate object. It will be seen by it that Mr. Anschütz's illustrations agree in all points with the accounts of the diseased sensitives, as laid down in my previous treatises, and that his

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drawings, founded on the one hand on actual inspection, and on the other on his knowledge of drawing, do not deviate from them in any essential points. I have often been compelled to meet the objection, that my conclusions are inadmissible, because the statements of the sick are not to be depended on.* While, now, such objections against patients whose minds are perfectly clear, and who regularly perform their daily duties, are groundless, and easy to be rebutted, every pretext against the reception of my observations is now for ever removed through Mr. Anschütz. In the same way, the drawings of the luminous phenomena which I gave in the earlier treatises have been many times attacked because they were founded in part upon descriptions, more than upon actual sight; and the wish has been expressed, that they could be made by an immediate observer, himself a draughts-

* This clumsy objection may often be met with among unreasoning sceptics. The brains of some persons are, in various respects, analogous to those of idiots, inasmuch as they are deficient, either wholly or in part, of certain portions of the organization necessary to the completeness of this very important viscus. With such individuals, where they are discovered, it is useless to spend time in endeavours to clear up points of newly discovered facts. They revert with tenacity to their own conceits, and are for the most part so much like the fool of Shakspeare's thought, that they are better left to their own kind of wisdom, where ignorance is bliss. In a case of a lady willed to sleep at a distance of two miles, there occurred during her state of somnambulism some facts corroborative of the impressions made on Mr. Anschütz, and reproduced by the power of his art upon the minds of others. The patient saw her sister wherever she moved about the house, with a face emitting the odic light, more especially from the eyes, mouth, and forehead. A lady residing at the Mesmeric Infirmary is of the class of the Baron von Reichenbach's healthy sensitives. She has afforded, in her waking state, striking corroborations of the accuracy of Mr. Anschütz in the delineations of the facts he witnessed, as well as of the truth of the statements of several of the Baron's other cases.

man. Now, then, I introduce an observer and draughtsman, armed *lege artis*, to the physical world, in Mr. Anschütz, whose sensitiveness will doubtless endure as long as his life, and whose ready kindness will afford every stranger repetitions and confirmations of all that is here said.

312. Baroness Maria von Augustin, wife of Baron von Augustin, Major in the Imperial Army of Austria, a lady of distinguished scientific culture, very healthy, soon discerned in the dark room all magnets, bars, and horse-shoes in a luminous odic glow, at first only as a luminous cloud, afterwards appearing with the true outlines of the objects. On bars eight inches long she saw light streaming out as a continuation at the ends of both poles; on one, three, and five-fold horse-shoes, after the removal of the armatures, fine vaporous emanations of light, four to eight inches long, larger and stronger at the north than at the south poles. On a nine-fold, and still more on a strong electromagnet, she saw flame-like appearances of light as high as a man, rising up, giving colours, sparks and smoke, ascending to the ceiling, and diffusing a light over it.

313. Wilhelmine Glaser, 24 years of age, daughter of an innkeeper at Bachtitz in Moravia, at present a chambermaid in Vienna, somewhat short, but stoutly made, always healthy and strong, who had been uninterruptedly engaged in laborious service for six years, saw all odically luminous objects after an hour's sojourn in the darkened chamber: for instance, she saw all magnets in a white glow, and the poles with flames blue on the northward side, and reddish-yellow and brownish-red on the southward. She found the flames on a round magnetic rod twenty inches long, four inches in length at the former, two inches at the latter. The nine-layered horse-shoe, standing upright, gave vertically ascending flames, twenty inches long, pale yellow and blue at the northward pole; and ten inches long, yellowish-red, at the

southward, both terminating in smoke streaming up to a long distance. She beheld flames forty inches high upon an electro-magnet.

314. Mr. Sebastian Zinkel, an old man in his 77th year, who had been all his life healthy and vigorous, formerly an innkeeper, at present living retired in his own house, No. 87, Nussdorf, near Vienna, received from me magnets, crystals, &c., to take home and examine during the darkness of night. As he enjoyed but little sleep, he occupied himself with these for many hours in the dark, and gave me very exact accounts of what he saw. He saw a one-fold horse-shoe incandescent, both when closed by the armature and open ; when open, the light was stronger at the poles than at the bend ; when it was closed, the reverse. He saw luminous, flame-like, continually moving streams of light issue from the poles of the open magnet on both sides ; from the southward pole, dull and yellowish red, about two inches long ; from the northward pole, four inches long, bright and blue. They both ended in a smoky, vapourous essence, which reached to three or four times the length, and then was lost. He saw the entire horse-shoe enveloped in a luminous cloud as thick as one's finger, stronger when the armature was removed, weaker when it was in its place. In the latter case the armature partook of the incandescence of the magnet, and appeared red where it was in contact with the northward pole, and dark grey where it touched the southward pole. Thus an old man, of 77 years, saw the odic light over the magnet quite as well as a youth at the period of the development of puberty, or a young pregnant woman.

315. Dr. Nied, a physician practising in Vienna (No. 396, Suburb of Erdberg), 32 years old, was an invaluable discovery for me, since he is a physician, and a witness of the odic luminous phenomena from a caste,—that of the medical profession, namely,—in which my researches, con-

trary to all expectation, have frequently met with very unfriendly reception. Dr. Nied is a strong healthy man, kept in constant exercise throughout the day by a large practice, and of lively temperament. He nevertheless saw odic light of all kinds well in all directions ; in particular, magnets with the metal luminous, large and small bars as well as simple and many-layered horse-shoes. He perceived smoke-like and flame-like emanations over a rod eight inches long, and one twenty-four inches long, and also over a one-fold, a seven-fold, and a nine-fold horse-shoe. He always found them half as long again on the negative pole as on the positive. Open horse-shoes were enveloped in a luminous down-like vapour. He saw the flame-like appearance over the nine-fold horse-shoe blaze up forty inches high, the flames of both poles united into a column, and the bright vapour rising above this to the ceiling of the room. And even the steel hands of his watch, which were doubtless strongly magnetic, appeared in a luminous glow so strong, in the absolute darkness of the profound chamber, that he could read the time on the dial plate.

316. Baron von Oberländer, of Schebetau in Moravia, about 35 years of age, continually on horse-back in his duties as Ranger of Forests, and engaged in the woods in all weathers, of strong constitution, iron health, and free from illness all his life, accustomed to every vicissitude of cold and heat, rain and storm, found all magnets luminous that I placed before him in the dark. He saw the perfect form of strong and weak needles of four inches length weakly incandescent, and emitting flames an inch or more in length from both polar extremities. A pocket horse-shoe appeared to him to possess little flames on the poles from two-fifths to four-fifths of an inch in length, the smaller at the southward pole, the larger at the northward. He perceived a three-fold horse-shoe odically incandescent throughout its steel substance, and enveloped entirely in a delicate

light, which was stronger toward the poles, and weaker toward the bend ; flickering, unsteady flames on both sides, iridescent in brilliant colours, at the northward pole bluc, green, whitish, and purple, of a hand's length ; at the southward pole yellowish-red, and of a finger's length, all of such beauty that he delighted to remain looking at the novel sight. A large nine-fold horse-shoe, examined at a distance of one or two paces, appeared to him to have a powerful blazing light, nearly as broad as a man, and rising to such a height that it almost reached the ceiling, and throwing him into a state of astonishment from which he could not recover himself, until I told him that many others had previously seen this light as large at my house. This great luminous appearance seemed to him yellowish-grey, moving about, of a delicate, ethereal nature, and capable of being diverted by blowing on it. He could not examine it closely ; it was so delicate and weakly luminous that it then disappeared from his eyes, but was always perceptible again as soon as he stepped back a pace. The nine-fold horse-shoe emitted flashing sparks laterally below its poles, flying off and whirling round to the side like extremely minute stars : he compared them to the sparks of crackling pine charcoal. This is the same observation that had already been noted down from the statements of Miss Reichel, and was figured in the illustrations to the first of these treatises.

But unquestionably the most remarkable individual of all the healthy sensitives, whose perceptions exceeded those even of many diseased observers, in strength, distinctness, and duration, was—

317. Josepha Zinkel, a girl of 23 years, daughter of Mr. Zinkel of Nussdorf, near Vienna. She is of the tall powerful race of the Austrian stock, different from anything else I have ever met with in Germany, perfectly healthy, and of a quiet, reserved temperament. She always saw

steel magnets with their form distinctly marked out by luminosity. Two needles, each four inches long, appeared to her to possess blue flames nearly or quite two inches long at the northward poles, and reddish flames four-fifths to six-fifths of an inch long at the southward poles. She found a rod eight inches long to have a blue flame four inches long at the northward pole, and a reddish one, six-fifths of an inch long, at the southward pole : a rod twenty-four inches long, blue for a hand's length beyond the northward pole ; red, and half as long on the southward, with smoke. She saw a flaming light ten inches long on a rod five feet long. Medium horse-shoes presented sometimes flames, sometimes luminous clouds, from a hand's to an arm's length, over the poles ; very strong ones, such as a nine-fold, flaming and vapourous masses of light, which ascended to the ceiling of the chamber, always larger, stronger, and brighter at the northward than at the southward poles. These experiments were repeated hundreds of times, with countless modifications, in the course of a daily pursuit of them during a long time, and were accompanied by weaker and stronger results,—of which I could not enumerate half,—according to the fluctuating sensibility of her subjectiveness depending upon her physical and mental condition at the particular epochs.

318. Pregnancy must be regarded as a particular kind of condition of health. I have luckily been able to obtain a few representatives of this among the sensitive. Mrs. Cecilia Bauer, wife of the innkeeper Bauer, of the suburb Brauhirschgrund, Vienna, 26 years of age, in the sixth month of pregnancy, of tall, powerful frame, lively, open temperament, is a perfectly healthy person, and has been so all her life. But she is sensitive to a degree that I have seldom found, so that she exceeds even many somnambulists in excitability, and leaves all the other healthy persons far behind her. Scarcely, after she had entered the dark

chamber, had I excluded the light and directed her attention to her hands, when she began to describe appearances of light appearing before her, at first weak, but soon so strong, that it was a real delight to carry on the investigation with her. She saw all steel magnets odically incandescent, and red and blue flames flicker at the poles, usually half the length of the steel itself. Weak horse-shoes seemed to her to have yellow and blue, stronger ones red and blue flames over the poles, mostly passing above into a beautiful iridescent play of colour, which she described with vivid delight : the large nine-fold horse-shoe, which was then somewhat more weakly magnetic, appeared to blaze with a flame forty inches long, and from this smoke ascended to the ceiling. I never heard either a healthy or diseased sensitive speak with more decision and certainty of the odic luminous phenomena before them, than did this pregnant woman.

I must here also mention one more,—Mrs. Josephine Fenzl, who has already been named, § 302. During the experiments made with her in the year 1846, she was in her usual condition of health : those of 1847, however, during a period in which she was pregnant, and gave opportunity for comparison of the two conditions in one and the same sensitive.

319. None of these perfectly healthy persons knew anything about their most remarkable and interesting peculiarities, and they were not a little astonished at the discovery, under my guidance, of powers of which they had never before dreamt. The manner in which I come upon the trace of them, which I at once take up and follow, is now simply this : I inquire among my acquaintance whether they know any one who is frequently troubled with periodical headaches, especially with megrim, who complains of temporary oppression of the stomach, or who often sleeps badly without apparent cause, talks in the sleep, rises up or even gets out of bed, or is restless at

night during the period of full moon, or in whom the moonlight in general is disagreeable; or who is readily disordered in churches or theatres, or very sensitive to strong smells, grating or shrill noises, &c.; all such people, who may be otherwise healthy, I seek after, and make a pass with a finger over the palm of their hands, and I scarcely ever miss finding them sensitive. When they follow me into the obscurity of my dark chamber, and remain there an hour or two, their surprise is excited by the perception of a quantity of luminous appearances of which they had not previously the slightest idea. The great number of people who are in this state of excitability does actually exceed belief, and I state it below rather than above the reality, when I say that at least a third part of the population are sensitive: for on every side on which I turn I meet with healthy sensitives, and I could in a few days collect not dozens, but hundreds, if it were requisite. It will, and must, soon be proved how little ground there is to doubt these asseverations. Sensitiveness is not a rarity among human beings, as I myself thought some years ago, but a very generally distributed quality, which, after my accounts, will soon be discovered in every direction, and will throw open a new and not unimportant page of the human condition.

But let us follow the appointed course, and come now to the

b. Sickly Sensitives.

320. Under this denomination I comprise all those who are able, like the healthy, to follow their occupations, but from time to time suffer from indisposition and disorders which confine them to their room or to bed.

321. Miss Susanna Nather, 37 years of age, daughter of an officer of Basle: I met with her sick in a convent in Vienna, with all the symptoms of strongly marked sensi-

tiveness. When she was so far recovered as to be able to leave the infirmary, she accepted my invitation to visit me for some weeks at my estate, where I subjected her to daily experiments, to which we shall frequently recur. It was remarkable that, with great sensitive excitability to all that affected the feeling, she never could see the magnetic light in the dark. We thus find, on the one hand, very exalted sensitiveness, in persons who occasionally suffer from nervous disease, but whose optical apparatus does not enable them to detect the odic light; while on the other side we possess perfectly healthy persons, in great number, who see these luminous phenomena with the greatest ease and distinctness.

322. Miss Josephine Winter, at present in Vienna, No. 60, Suburb St. Ulrich, step-daughter to Mr. Schmal, the painter, of Grätz, 19 years of age, tall, of a full habit, strong, healthy, full of gaiety, and at present perfectly healthy, passed through a violent nervous disease two years ago, during which she for some time suffered from spasms and somnambulism. A sensitive excitability has been left behind by this, which may be readily called out by reactions. She saw all magnets laid before her in the dark in a whitish odic incandescence. Needles eight inches long flamed at both ends to a length of an inch or more, both more strongly and blue at the northward pole, red at the southward. A long one-layer horse-shoe appeared to her to have a flame at the negative pole six inches, at the positive four inches long, both being themselves in a delicate luminous vapour. She found a three-fold horse-shoe odically incandescent, white, enveloped in light, and flaming to a height of eight to twelve inches at the poles; on one bright blue, on the other yellowish-red. The flames flared backward and forward when she blew upon them.

323. Mrs. Johanna Anschütz (*née* Steiner), wife of the above-mentioned Mr. Gustav. Anschütz, 28 years of age,

mother of two children, a lady of delicate nature, readily thrown in a state of reserve, susceptible as she was excitable to all impressions on the feeling, had suffered almost throughout her life from various acute diseases, which always terminated in a spasmodic condition, and not unfrequently brought on fits of somnambulism. For some years she has been healthy, but very slight mental shocks suffice to reproduce the latter at once. She was kind enough to submit to the trouble of testing her vision on the luminous phenomena, and saw a great number of them, both in my darkened chamber and at night in her own house. She saw two magnetic needles, four inches long, flame to a length of two-fifths to four-fifths of an inch at both poles. She saw a pocket horse-shoe emit light at both poles. She perceived a one-layered horse-shoe, twenty inches long, luminous in its perfect figure, and diffusing moving, luminous, flame-like vapour at both poles. She saw a three-fold horse-shoe luminous throughout its mass, and seamed with intense light at all the edges, especially at the edges of the poles. Another time, during menstruation, she saw a delicate luminosity flaming up eight inches long over both poles of the same three-fold horse-shoe. A five-fold horse-shoe seemed to her to have a luminous vapour of a hand's length at both poles. A seven-fold gave light only at the northward pole. She found a nine-fold horse-shoe principally luminous at the edges, and delicate flames sweeping up sixteen inches above the poles, which, according to her statement, required to be held at some distance from the eyes to be seen distinctly, becoming indistinct when brought too close, and disappearing when in immediate proximity to the eye. She described the flames themselves as so extraordinarily delicate and ethereal, that she could not compare them with a common flame; they seemed only a pallid luminosity, so immaterial that they could not be looked close at without, so to speak, dissolving into nothing. They were only to be perceived

once only four-fifths of an inch, at another time ten inches long, disappearing when I applied the armatures, and flashing up when I removed them; moving unsteadily, sparkling, always larger and blue at the northward pole, smaller, duller, and reddish-yellow at the southward; in all cases marked somewhat more brightly and distinctly at the edges and corners of the poles.

325. Miss Wilhelmine von Weigelsberg, about twenty-three years of age, residing in Vienna, No. 451, Fleischmannsgasse, in the suburb of Wieden, with her aunt, suffers much from spasms and uncertain health, although she looks well. She saw magnetic needles four inches long glowing pale white throughout their steel substance, brighter towards the poles on both sides than in the magnetic axes. She found all the poles furnished with little flames, bluish on one side, and yellowish-red on the other. She also perceived horse-shoe magnets in an odic incandescence; a pocket horse-shoe, which I had given her, appeared to her at night, at her own house, to have smoke-like delicate flames on both arms, four-fifths to six-fifths of an inch long, a little smaller at one pole than at the other, unsteady, sometimes brighter, sometimes more cloudy, now larger, now smaller, occasionally blazing only at one arm. In my darkened chamber she saw, on a five-fold horse-shoe, only a short, weakly luminous spot on the southward pole, and a restless vapourous flame, an inch and a half long, on the northward pole. She perceived flame-like lights blazing to a height of almost twenty inches on the large nine-fold magnet, illuminating the immediate vicinity.

326. A strange phenomenon referable here is that of a *blind sensitive*, the master cabinet-maker, Johann Friedrich Bollman, of No. 268, Ferdinandsgasse, suburb of Wieden, Vienna, a tenant there of a house belonging to Mr. Gustav. Anschütz, to whose friendly interest I owe the knowledge of this remarkable man. He is fifty-six years of age, born

at Kiel, in Holstein was, thirty years ago, servant in the laboratory of our distinguished physicist Pfaff, in that place ; suffered for a long time from affection of the lungs, got cataract, and was unsuccessfully operated on by Prof. Jäger, and has now been blind for some years : that is, unconditionally blind for all shapes and material forms of things, but not altogether insensible to the general impression of light. The poor man no longer possesses a crystalline lens, but his retina is still healthy. Thus, rays of light which now fall upon his disordered eyes can no longer be collected into a regular picture, but, penetrating diffusedly through the opaque fluids of the eye, they arrive at the retina, and are conveyed to the mind by the power of sensuous perception. The necessary result of this is, that he can perceive light and colour, but not form. When any one has on bright-yellow or bright-blue clothes, a young lady a green or red shawl, he detects the colours if they are strongly illuminated ; but a green branch or a red door would produce the same effects upon him. Now this blind man happens to be sensitive. He was brought to me at Castle Reisenberg ; I kept him there all night, and took him next morning to my apparatus in the darkened chamber. After remaining quiet in the dark for an hour, he, this blind man, saw a quantity of luminous phenomena, which I, who could see, was unable to discern ; and when we necessarily moved backwards and forwards among the odically luminous objects, it *happened, perhaps for the first time since men have existed, that the blind led the seeing* ; namely, Mr. Bollman led me. Our parts were exchanged. The daylight in which I was able to act was taken from me, but for him the odic light, which reacted upon him and not upon me, was increased. I shall return to all the details in their proper place ; here I have only to notice that he perceived a little pocket horse-shoe lying upon a table as a luminous spot ; that he did not at once observe a long one-layer

horse-shoe when close to him, but when I removed it a step from him, and took off the armature, he discerned a sudden flash of light, which gradually disappeared after a few seconds. He observed this only at one pole, which I, when he directed my hand to it, recognised in the dark, by the marks upon it, as the northward pole. A three-fold horse-shoe remained permanently luminous to him. He could not see the iron substance in its weak odic incandescence; but as soon as the armature was removed he detected a permanent light, and this again at the northward pole only. He described it as a roundish luminous spot, of about an inch and a half in diameter. A nine-fold horse-shoe produced a large luminous cloud, which spread its light almost forty inches round upon the neighbouring objects. Thus, odic light traversed the vitreous humour of his eyes, and was received by the nervous plexuses of the retina, like other light, but did not impart to him any configuration of the shape of magnets, odic flames, vapour, or sparks, but only an impression of diffused light. The present case certainly affords a most rare and certain point of support as to the nature of the odic light.

327. One of the sensitive young women had told me that she had suffered from chlorosis in her childhood, and had taken particular fancies to certain kinds of food, especially to all raw substances. Since I already knew from other quarters how fond all the more highly sensitive are of raw food, I was led to the idea that chlorosis might perhaps be accompanied, among other things, by distinctly-marked sensitiveness. In order to test this, I looked about for chlorotic patients, and soon learned that among my own work-people at Reisenberg Farm, there was a girl who had suffered unceasingly for three years from chlorosis. I at once subjected her to investigation. Anka Hetmanek, twenty-one years of age, short, but stoutly made, corpulent, esteemed as a spirited and industrious girl, of quiet character,

a clever silk-spinner : has only menstruated once in her life : is free from headache, but suffers much from disorder of the stomach as well as chlorosis, and is attacked by the pain at all times. At the very first reactions she proved to be perfectly sensitive. Every sensation that characterises this appeared in her to its full degree. She saw all magnets odically incandescent in the dark, with a whitish light, even when the armature was applied. When it was removed, she discerned the odic flames over the poles, stronger and blue at the northward pole, smoking strongly at the southward pole ; the electro-magnet with coloured odic flames, &c.

328. Mrs. Francisca Kienesberger, thirty-nine years old, wife of a land-steward, mother of two grown-up sons, living at No. 97, Mittelgasse, suburb of Schaumburgergrund, Vienna, is very well-looking and stout, exceedingly lively, excitable, and unreserved. She suffers very frequently from headache, slight pains in the stomach, and occasionally from attacks of spasms. She is sensitive in a high degree. At my request, she stayed at my house, from time to time, for several weeks. She saw all magnets strongly incandescent. Two steel needles, four inches long, appeared to have flames nearly an inch long at both poles. A magnetic rod, five feet long, almost as high as a man, seemed to have a flame eight inches long at the northward pole. All horse-shoes were luminous, both when the armature was applied, in which case the magnets were enveloped in fine luminous mist, as has been already described by Miss Reichel, and also when I took the armature off, in which case the poles exhibited flames. She saw a pocket horse-shoe four inches long, with flames of four-fifths of an inch. She saw a one-fold horse-shoe in a whitish glow, with flames as long as a finger on the poles, passing into luminous vapour. A seven-fold horse-shoe appeared to have lambent yellowish flames, as large as a walnut, on both poles, waving about on them ; another time, during menstruation, she saw the same covered

eight to twelve inches high with luminous flame-like vapour ; a nine-fold horse-shoe appeared to her, in her usual condition, in a white odic incandescence, and to have flames twelve inches high, which rose up in luminous vapour in the room : at the period of her menstruation, the flame-like light seemed to blaze up five feet above the poles, ending at the top in bright vapour, which stretched up to the ceiling. When I opened the large magnet before her in the dark, she uttered an exclamation of surprise and delight at the splendour of the flames, the flying sparks and variegated lights of which then suddenly burst forth.

c. Diseased Sensitives.

329. Miss Amalie Krüger, thirty-seven years of age, daughter of a head-waiter of an hotel, resident at No. 27, Grosse Ankergasse, Leopoldstadt, Vienna, a woman of gentle disposition, serious tastes, well educated in languages, and thus more capable than many others of expressing herself clearly respecting her observations ; of healthy appearance, and full habit. From youth she has suffered from many kinds of nervous affection ; has, at various times, been a sleep-walker, which condition came and left her at intervals, and she has suffered much from spasms, which were very readily re-produced. At such periods she saw the magnetic flame very vividly, to a length of from four to eight inches. She visited me now and then for a few days, and very kindly devoted herself to the odic investigations, various reports of which I shall give in the sequel. In the darkened chamber she always saw the light flash up from the magnets most distinctly when I pulled off the armature, and at the moment when I applied it again. The vaporous lights which she discerned upon open horse-shoes were not large in proportion to her great sensitiveness, usually only about an inch long, and always visible on one pole alone, which constantly proved to be the northward. This was the case with a

pocket horse-shoe, a large one-layer, a three-fold, and a five-fold magnet.

330. Friedrich Weidlich, thirty-two years of age, formerly in the English navy, now an invalid, staying in Vienna, severely and incurably affected with hypertrophy of the heart, accompanied with spasms and periodical attacks of somnambulism. This man, I know not whether by his own fault or not, is in bad credit among the physicians of Vienna; I do not inquire into such matters, but I have seen that in the tests which I applied to his sensitiveness he always adhered to the truth, and gave me genuine accounts. From the abundance of experiments and observations I have now collected on the subject, it is wholly impossible for a sensitive to deliver me even a single untrue sentence without immediate detection, since with every new patient I again go through all settled questions from the beginning, and they are controlled beforehand, or, whatever any one tells me new one day, I repeat upon other sensitives the next morning; not to say that such a person, even if he were a graduate of physics, would be unable to see or guess the sense and purpose of the cross-questioning to which I subject him. At all events, all and every statement Weidlich gave me bore the stamp of exact rectitude, and held good in all cases under manifold controls: I have nothing to do with any other affairs he may be concerned in. He saw all magnets glowing palely with a whitish-red light throughout the substance of the steel, brighter toward the poles, almost dark in the axis. He found magnetic needles four inches long emit little flames from both poles, larger from the northward than from the southward pole. In a subsequent experiment, he gave the size of the former as two inches long, and the colour bluish; the latter an inch and a half long, and yellowish. He described a long single-layer horse-shoe as having very thin flames at both poles: somewhat stronger, larger, and blue at the northward pole; smaller, duller, and

reddish yellow at the southward pole. A three-layered horse-shoe possessed a flame on the northward pole of a hand's length, iridescent, but predominantly blue ; and at the south pole a somewhat duller, smaller, reddish-yellow flame, and these rose up side by side, terminating in strong smoke. A large nine-layered horse-shoe seemed at first, when very close, to have a flame about eight inches high, with much vapour over it ; but when I removed him a step back from it, he perceived the great tall column of light, which he had not seen before. He now described this as equalling the height and breadth of a man, intermingled with smoke above, which curled up to the ceiling of the room, and lighted up everything. He stated the colour to be yellowish-red and bluish, and that it was in constant motion : when I blew upon it, the column was distorted, but soon restored itself again : in a subsequent experiment, he gave the size somewhat less, but all in proportion ; thus corresponding either to subjectively weaker power of vision, or objectively less intensity of the magnet.

331. Miss Clementine Girtler, eighteen years of age, daughter of a draper, residing at No. 63, Hauptstrasse, Wieden, Vienna, a delicate impressionable girl, had suffered for a long time from liver-complaint, and had fallen into active somnambulism : during this, the moon acted uncommonly strongly upon her, and, through the good offices of her physician, Dr. Horst, junior, who completely cured her, I was frequently eye-witness of the strangest abnormal affections. She saw luminous appearances issue from open horse-shoes in the dark, both from a small one, and from a seven-fold horse-shoe. I was not able to get her to my darkened chamber ; I was therefore unable to institute more circumstantial trials with her ; nevertheless, the above facts are sufficient here.

332. Johanna Kynast, twenty-two years old, daughter of a baker at Waidhofen, living with relations at No. 127,

Schmidtgasse, Braunhirschengrund, an extremely well-looking and stout girl, was laid up with a nervous fever five years ago, and since then has constantly suffered from nervous attacks, and from time to time fallen into a state of somnambulism, which continues for some weeks, then disappears for weeks or months, returns, and so goes on. She paid me a visit, and remained some days. At first she did not see much in the dark chamber, and that little with a remarkable degree of intermittence, although she remained almost an hour in the dark. Quite unexpectedly, she now fell spontaneously into the somnambulistic sleep. It endured for half an hour, and I let her continue it quietly until she desired me to awaken her at once. As soon as this was done, she saw well all odic light of human beings, crystals, substances, &c.; and magnets, even when the armatures were applied, all appeared to her in a delicate whitish light of odic incandescence. She saw both needles and bars of different sizes, as well as horse-shoes, with flames at the poles. A long one-layer horse-shoe had a flame two and a half to three inches long at both poles; medium horse-shoes longer and brighter in proportion to their strength; the nine-layered appeared to have a flame more than twenty inches high upon the northward pole, less than twenty inches at the southward; luminous grayish smoke streamed up more than five feet high above these. She described the flame of the northward pole as larger and rather bluish; that of the southward poles as smaller and reddish, passing into red. The whole vicinity was lighted by them.

333. Francisca Weigand, twenty-seven years old, sister of the hatter Weigand, residing at No. 30, Obere Pfarrgasse, Windmühl, Vienna, born in the district of Königshofen in Franconia. With an affection of the bronchi, she fell into a periodical somnambulism. This girl possessed a remarkable power of vision for the odic light, and through her obliging readiness most interesting results might have

been arrived at. Unfortunately, I was opposed in every way by a quacking physician, without any idea of the scientific value of the case which had unluckily fallen into his hands ; the poor somnambulist was allowed to tell fortunes, and make a source of profit of her misfortune, and soon acquired a lamentable celebrity all over Vienna. This is just the way in which, in France and Germany, the most interesting phenomena of somnambulism have had a stigma cast upon them, and been brought into discredit in public opinion. I myself was present at one earnest reproof that was given to him by the worthy Professor Lippich on this account, but without effect, as the sequel only showed too well. I brought her some small magnetic rods and horse-shoes. She saw the metallic substance of all very well in the dark, glowing, duller around the axes, brighter towards the poles ; a little rod four inches long exhibited to her a flame of two inches at the southward pole, of six inches at the northward pole. The horse-shoe, the armature of which she saw glowing, emitted flames from both poles when this was removed ; that from the southward pole as long as the arm of the magnet, that from the northward equal to twice the length. Moreover, the entire horse-shoe was enveloped in a delicate mist of fire, as had been described by Misses Reichel, Atzmannsdorfer, Maix, and some of the most remarkable sensitives.

334. I have now added *fifty new witnesses to the six or seven original ones*, and, like the reader, I begin to tire of always relating one and the same thing, and wasting myself in repetitions. I could easily go on bringing forward many fresh sensitives and their statements ; I think, however, that we have more than sufficient. Every *reasonable* doubt to which the five sensitive girls first named might have been exposed, must disappear before the multiformity and credibility of the facts, vouched for by persons differing most

widely in age, sex, residence, position in life, and occupation, and by persons of the highest respectability,—facts, for the control and repetition of which, in other places, I have always furnished the most complete facilities. I know that, in spite of this, there will remain plenty of people who will not yet be satisfied—since there is such a thing as *unreasonable* doubt ; there is such a thing as absurd scepticism ; and, finally, there is also such a thing as malevolent scepticism.*

This I cannot and may not refute ; I here have to do only with sensible, reasonably-judging people ; with the friends of peaceful, scientific progress ; and these will, I hope, have been satisfied with what I have brought forward, that is, so far as the establishment of the fundamental fact

* A small society of physicians in Vienna lately afforded us a lamentable example of this. After half a year's continued investigation, these came to the edifying result that Misses Reichel, Krüger, Nather, and others, were nothing better than open liars and deceivers ! I really pity these gentlemen,—altogether not less than three-and-twenty Doctors and Professors of Medicine,—that in twenty-two sittings they could not get nearer to the truth, and gradually went so monstrously astray with their sensitives, that at last all lost themselves together in open lying and deceit. I will not mention names. No one who reads the report which they published under the ægis of the Journal of the Medical Society of Vienna, in November and December, 1846, can avoid feeling a sensation of sorrow that powers which might have rendered essential service to science, if they had so willed, should have been wasted in so sad and useless a manner, even to the manifest prejudice of enlightenment. For, instead of ascertaining and bringing to light truths, the most contrary conclusions are dragged forward through a series of badly-arranged experiments ; and facts, which were already to be regarded as secured, again enveloped in mystery. I will correct these mistakes, in notes, as often as I have opportunity in the course of my treatises ; not because I believe that they require refutation with persons who know anything of such matters, for they refute themselves in the eyes of the initiated by their own complete emptiness, but because unscientific persons and foreigners must be guarded against deception.—*Author's Note.*

is concerned, that *magnets emit light in the dark*, which not all, but very many *healthy* and diseased persons are able to see with complete distinctness and certainty.

Uniting all these observations and depositions of evidence into a kind of collective testimony, we obtain the following *well-grounded axioms* :—

a. All steel magnets independently emit light,—odic light, in the *wider acceptation of the term*. This light appears under different forms, which exhibit unequal intensities, unlike colours, unlike densities, unlike motions, &c.

b. Not every eye is fitted to detect this. *A certain class of persons have the capacity*; the individuals may be healthy or diseased. Certain diseased conditions raise this power to a high pitch; but it is also met with, here and there, almost as strong in healthy persons.

c. *The odic light is extremely weak*, and is so much surpassed by every other known light, as to be thus rendered invisible. In order to discern it, the eye must be prepared beforehand by sojourn *in absolute darkness for hours*. The very slightest trace of light penetrating into a darkened space almost always renders the observation impossible; in any case quite uncertain.

335. The establishment as firmly as possible of the fundamental proposition, that from the magnet emanates light—that is to say, a new, hitherto unknown something, which cannot be brought into connection with our existing conceptions of magnetism, whether or not it be luminous, or other peculiar properties inherent in it—was a point about which I could not spare any pains; and it was the more necessary that I should substantiate it by all the means in my power, since at present I have no method of material proof for the force, which can be used for universal illustration, of the kinds which exist in other physical experiments. But having once established it, and following the path of induction, by the enumeration of a superabundant

amount of uncontested individual cases, given it the rank of a natural law, I have considered it unnecessary, and that it would be thought a tiresome and useless superfluity, for me to give the detail of all the further investigation of this subject in its immeasurable field, and every development of its specialities and individual parts, in the same way, through several dozens of nothing but repetitional and confirmatory experiments on fresh persons. I have, therefore, given this up from this point, and contented myself with supporting the rest of my observations by a less extended collection of testimonies; yet in all things in any degree important it will be found that I have never taken less than ten or twelve different persons for witnesses. I beg that the account of my further researches may be criticised according to this principle;—these treating of the appearances of the odic light in its different forms.

FORMS OF THE LUMINOUS EMANATIONS OF THE MAGNET.

336. So far as my researches extend at present, the odic light, in the wider sense of the term, appears in five forms, producing different sensuous impressions, namely, in the condition of :—

1. Incandescence.
2. Flame.
3. Threads, streaks, and nebulæ.
4. Smoke.
5. Sparks.

We will examine each of the various kinds of appearance in turn.

1. ODIC INCANDESCENCE ON THE STEEL MAGNET.

337. We have seen that a peculiar kind of luminous condition, in which the magnetic steel seems in a weak glow, and for which I have not been able to find a better term than “odic incandescence,” is one of the commonest and

first phenomena, which almost all sensitives perceive in deep and long continued darkness. I have expressed my opinion on the nature of this light in the preceding treatises, and now brought forward altogether, with the old and new, more than fifty eye-witnesses of the fact of its existence. The next question is, whether the odic incandescence remains the same under all external circumstances ; whether, and if any, what modifications it is subject to.

338. A simple bar magnet, twenty inches long, lying in the meridian, its northward pole carefully turned to the north, was shown to the youth Stephen Kollar, in my darkened chamber ; he saw only a third part of the bar in distinct odic incandescence, this occupying the northward end ; the other two-thirds almost escaped him, so that he only discerned slight indications of it. I showed the same rod, under the same circumstances, to the healthy maid Zinkel, Mrs. Bauer, Dr. Nied, Baron Oberländer, Mrs. von Varady, Mr. Rabe, Mrs. von Peichich, and many others. They saw it luminously incandescent throughout, strongest at the two poles, and decreasing toward the middle. But they did not find the colour of these lights the same in all parts ; the half turned toward the north had bluish, that toward the south a yellowish red light, agreeing with the colours of the flames emitted by the two poles. Moreover, Josepha Zinkel did not find the division of the bar into two parts equal ; the bluish half was somewhat shorter, the reddish somewhat longer. I turned the bar round, laid it in the reverse direction,—namely, with the northward pole towards the south, and the southward towards the north, so that the poles of the bar and those of the earth coincided. The colours of the bar now became dulled and somewhat modified. The reddish half was now turned toward the north, the bluish toward the south ; but the blue was duller, and had assumed a tinge of red, while the yellow was dulled, with a great intermixture of gray ; the half turned towards

the north here again presented itself as shorter, that towards the south as the longer. Thus, however the position might be changed, and the colours altered in intensity, the luminous half of the steel magnet turned towards the north always remained the shorter. Instead of a bar, I took *an open horse-shoe* ; Prof. Ragsky, Mr. Schuh, Mr. Von Rainer, Mr. Hütter, and Mr. Delhez, saw the arms merely with a weak, dull, great light toward the poles. With stronger sensitives I placed both the poles in the meridian, sometimes towards the north, sometimes towards the south : in the first case the blue incandescence of the northward pole appeared enlarged and brighter, that of the southward subdued and dull red, passing into greyish-blue ; in the second case, on the other hand, the blue incandescence of the northward pole was weakened, dull, and had a tinge of reddish-grey ; but the red light was heightened, more brilliant, and increased in size. The like was met with in some other experiments, in which I placed before Josepha Zinkel a horse-shoe magnet, sometimes standing with the poles turned upward, sometimes lying flat with the poles turned to *the east or west*. In the first place, she said the poles of both sides were less luminous when lying in the parallels than when turned vertically upwards. And it proved that the poles appeared to have more of a greyish-blue light when turned toward the east, and rather a tinge of reddish-yellow when turned toward the west. Moreover, whenever in these arrangements the northward arm of the magnet came to be on the north side, and the southward toward the south, the odic incandescence became more brilliantly blue and red ; but on the other hand, whenever the arms were in the unconformable position, the flames were discoloured and dull. (I borrow the terms *conformable* and *unconformable* from geologists and miners, who call a stratification which runs in a direction contrary to the general lamination of a mine, unconformable, in contradistinction to

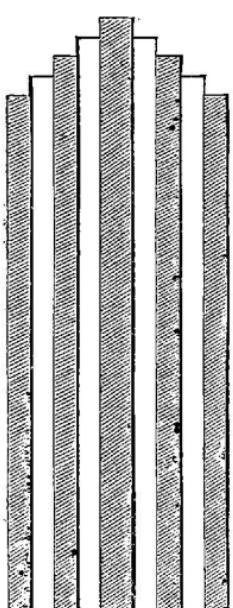
conformable, which coincides with the general parallelism. In the application of this, I call that position of a magnetic bar, horse-shoe or other shape, conformable where the northward pole is turned towards the north, and the southward towards the south ; the reverse position unconformable). I made the same experiments on Mrs. Kienesberger, with a three-fold horse-shoe, with the poles turned upward and the curvature downward ; the northward pole sometimes toward the north, sometimes toward the south. In like manner I repeated them with a nine-fold horse-shoe on Miss Atzmannsdorfer, not to mention many occasional repetitions on other sensitivcs. The results were always exactly the same ; I therefore omit repeating the description. These phenomena were in some measure parallel with the respective intensities of the magnetism of the earth, and of a magnetic bar, of which we know from M. Gauss that under our latitude they bear the inverse proportion of the weight of the eighth part of a cubic meter of the earth's mass and a steel bar weighing one pound. In other words, the magnetism of a common magnetic bar is, as a rule, more intense than the magnetism of the earth ; and the former so much exceeds the latter that it cannot be overcome by it within the duration of an experiment ; but at the same time the terrestrial magnetism acts so far that it visibly decreases the clearness and purity of the odic luminous phenomena of the magnetic bar, placed in the unconformable position ; however, from the connexion that exists between magnetism and Od, the allied phenomena accompany each other, as we have seen in many instances.

339. The result of a subsequent case, in which I placed before Josepha Zinkel a strong magnetic bar, twenty inches long, *in a vertical position*, with the northward pole turned upward, was similar. She saw the upper half of the steel incandescent in a yellowish blue-gray, the lower half

reddish-white. When I turned it the other way up, with the southward pole at the top, she found the upper half yellowish-white, the lower reddish blue-gray. When the same was done with a horse-shoe, both poles retained their colour, whether turned upwards or downwards, but they varied in colour and intensity of light. But the magnetism of the steel, and the odic condition complicated with it, always exerted a certain degree of preponderance over the terrestrial magnetism, in each case the more marked the stronger the magnet was.

340. These conditions exhibited greater complexity in a *compound magnet*. I went through many careful experiments on this point with Miss Zinkel. I placed before her, in the darkened chamber, a nine-fold horse-shoe of great power, upright, the poles turned upward and in the conformable position, the armature removed. She saw the side of the northward pole in blue, that of the southward in red odic incandescence. This was the case when she looked at the broad surface of the layers. But when she placed herself before the magnet in such a way that she looked at

FIG. 11.



the narrow, long side, so as to see the edges of all the layers, as in fig. 11, the picture of the odic incandescence changed. She now perceived that the layers did not all glow in the same colours; the middle, longest layer, which projected beyond the rest, and was the agent of the magnetism of the entire luminous bundle, was now seen to be blue in its odic incandescence on the *north side*. But the layer in immediate contact on each side had a different appearance—it appeared red. The next layers, that is the second from the middle, were blue again, the third red; and the fourth and last, that is, the outer one on each side,

were again blue. Thus the middle, and the second and fourth corresponding pairs of layers alone were blue; the intermediate, first and third pairs, were red. And the odic conditions were found exactly reversed on the southward side. Here the incandescent middle layer was red. The layer immediately applied to this on each side was blue, the second pair red; again, the third blue, and the fourth and outermost pair red. The colours of the odic incandescence of each particular layer were thus regularly opposed on the south and north sides, but in alternate order with those to which they were applied by their faces. Now, since all the layers were originally arranged and attached together with magnetism of the same kind, consequently with odic charge of the same kind, a reversal of the polar condition, a change into the opposite polarity, must have taken place in the first pair of layers during the conjunction. But when I examined the layers with the magnetic needle, I never met with any corresponding change of the magnetic polarity; this remained invariably northward in all the layers of one pole, southward in all those of the other. Thus it was not the magnetic, but only the odic polarities, that had been reversed; and the odic polarities changed, not *because* the odic polarities had been reversed, but *in spite* of their remaining constant. The strength of the light was greatest near the poles, and decreased gradually toward the bend; in this direction the blue became duller and duller, and passed into gray at the middle of the limb, the light disappearing wholly from the eyes of the observer at the bend; the red passed through reddish-yellow into yellow at the middle of the limb, then into gray, and became imperceptible at the curvature. Of the layers individually, the large middle, and the fourth, outermost pair, were most strongly luminous at the two poles, the intermediate pairs the weakest. Finally, when I placed the horse-shoe with both limbs in parallels, so that the flat sides of the layers

were turned towards the terrestrial poles, the dissimilar poles of the nearest layers, turned towards the terrestrial poles, were in every case more brightly luminous, at both poles, than the more distant poles turned in the other direction, which gave a duller light.

341. I find an account of these experiments, as performed on Madame Cæcilie Bauer, given in the following words in my journal :—“ She saw the large nine-layer magnet in bands of odic incandescence, like Mlle. Zinkel, both limbs of the large middle layer blue on one side and red on the other ; in like manner both limbs of the outermost pair of layers uniformly blue and red, when the entire horse-shoe stood conformably vertical, and with the poles turned upwards.” Further :

“ *a. On the entire northward limb* : the first pair of each side, next the middle layer, appeared red ; and the eastward layer more cloudy and more dull ; the western brighter, and with a tinge of violet.

“ The second pair, that is the intermediate pair on each side, gray all over, more dull on the eastward layer, brighter and yellowish-gray on the westward.

“ The third pair again seemed red, grayish-red on the eastward layer, pale orange on the westward.

“ The fourth, last, and outermost pair on each side, blue ; dark grayish-blue on the east side, sky-blue to pale-yellow on the west side.

“ *b. The entire south limb*, where the middle layer was red : the first pair, applied on each side to the middle layer, were blue ; the layer situated on the east side being rather grayish-blue, that on the west light blue.

“ The second pair, that is the intermediate, gray ; more dull to the east, and brighter, with a yellowish-red tinge, toward the west.

“ The third pair blue again, toward the east, passing rather into dull-gray ; toward the west lighter, passing from blue into yellow.

"The fourth, outermost pair, red on both sides; on the east side grayish-red, on the west side yellowish-red.

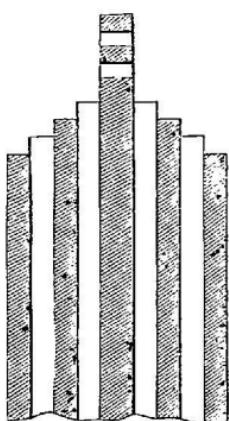
"The banding was a distinct alternation of incandescent layers of brighter to darker, but not of blue and red alone, as Josephine Zinkel had seen, but an alternation of these colours, combined with a general admixture of gray on the east, and of yellow on the west; so that all these tints were imbued on the east side of the middle, principal layer, both on the north and south limb, with a shade of gray; while all those on the west side had a yellow cast—slight, but quite perceptible; this was a kind of transversality, therefore a further complication. On the grayish, east side, the vividness of the colouring was generally troubled, diluted, and dulled; on the yellowish, west side, strengthened, heightened, and rendered more brilliant." We shall return to this hereafter, when I speak of the colours of the odic light.

342. I traced the principal phenomena of this experiment also on the far less sensitive Miss Josephine Fenzl. She did not see any clear distinction of colour between the layers, but an evident change from brighter to more dull, alternating. The brighter layers seemed to her pale reddish-gray; the duller, pale bluish-gray. Thus, her observation was sufficient to afford a certain amount of confirmation to that which her predecessors had seen.

343. The same phenomenon was produced in another way. I placed four magnetic bars of equal size, as an armature, upon the large nine-layered horse-shoe. I had proportioned the length and breadth that each fitted exactly, like an armature, on the poles of the magnet, and all four were so laid upon the poles, that in closing it they were piled one upon another, all their northward poles turned toward the southward, all their southward poles toward the northward limb of the horse-shoe. I allowed them to remain, thus arranged, for twenty-four hours, with the poles of the horse-shoe turned upwards and conformable. When I led

the maid Josephine Zinkel to this, in the darkened room, she saw

FIG. 12.



these bars varying among themselves in the banded condition, alternately red and gray incandescent, as in fig. 12. Immediately on the blue pole of the horse-shoe lay a red, and red-flaming bar; upon the red pole of the horse-shoe the same bar, at its other end, exhibited gray odic incandescence and blue flame. The succeeding bar had the reverse coloured light, the third the same as the first, and the fourth the same as the second. When I removed all

the little bars and examined them, I found them all southward polar at the one end, where they had lain upon the blue pole of the horse-shoe, and all northward polar at the opposite end. Thus there was no magnetic alternation of the poles of the bars, as they lay upon the poles of the horse-shoe, but nevertheless an od-polar alternation of colouring.

344. Thus the odic polarities are reversed when several like poles are placed side by side and coupled together. They then form alternating layers, and this in spite of the magnetism, which remains unchanged. Therefore we had here *negative magnetic poles in red odic incandescence*, and *positive magnetic poles in blue incandescence*, alternately stratified with negative magnetic poles of the usual blue, and positive, with the usual red odic incandescence.

This surprising phenomenon is one of the very striking distinctions between magnetism and Od.

With a view to strengthen this appearance, I placed a *bar magnet, twenty inches long*, near the side of the nine-layered horse-shoe, with the *unlike poles*. But the result did not correspond to my expectation. When I brought the northward pole of the bar to within about two inches of the side of the southward pole of the horse-shoe, the red odic

incandescence of the latter was certainly evidently increased, but the banding vanished, and Josephine Zinkel now saw nothing but full red layers, without any bands at all. When I made the same experiment at the other pole, with the corresponding modifications, she saw the compound horse-shoe simply in a blue odic incandescence. Thus the increase of the magnetism by magnetic influence removed the banding, the odic alternation of the layers, and raised one pole to exclusive power odically as well as magnetically.

When I in like manner brought the *like poles* near together, the result was still more unfavourable; all odic incandescence was extinguished, both red and blue colour vanished.

I now wished to test the influence which the *poles of crystals* might exert in such cases. Since the magnet acting upon magnetism disturbed the odic luminous phenomena there, it was quite conceivable that a pure odic influence, without magnetism, might influence in a different way the odic phenomena which the compound horse-shoe afforded. A totally different result was really produced; for when I brought the positive pole of a very large rock crystal, sideways, to within four inches of the northward pole of the horse-shoe, not only did the banding of the light and difference of colour not decrease, but the blue of the alternate layers increased considerably in distinctness and beauty, while the red became grayish-red. The same took place when I brought the southward pole and the negative pole of the large rock crystal near together, the red layers now becoming of a far brighter red than before, and the blue ones between them perceptibly of a more dull grayish-blue.

But when I approximated the positive crystal pole and the southward pole of the magnet, or the negative crystal pole and the northward pole of the magnet,—that is, like poles together,—all odic light of the same polar quality was

dulled, and disappeared from the eyes of Josephine Zinkel almost entirely ; while, on the other hand, the opposite kind of light was rendered more vivid and stronger.

This led me to investigate the *influence of the animal odic poles*. I turned my right and then my left side to the *positive limb of the compound horse-shoe* : the odic incandescence was not extinguished in either case ; on the contrary, in the first the odic incandescence, and the luminous force of the red layers, increased, and the blue ones became duller ; in the second the blue increased, and the red was rendered less bright. When I did the same with the *negative limb of the horse-shoe*, my right side produced an exaltation of the red and a dim condition of the blue layers, while my left rendered the blue brighter and the red more dull. Thus, each pole increased the odic colour of the opposite pole, and depressed that of the same pole ; and thereby it especially called out the banded condition of the layers of the magnet with great distinctness to the eyes of Josephine Zinkel.

From all this it follows, that *the magnet acts quite differently from crystal-od and biod, &c. upon the colours of the odic incandescence of steel magnets* ; i. e., that *the Od associated with magnetism affects the phenomena of odic incandescence in the steel magnet in a way essentially different from Od unassociated with magnetism, such as emanates from crystals and living organisms*.

345. The *completion of the magnetic circle by the application of the armature* exhibits great influence on the strength and distribution of the odic incandescence of the steel magnet. It has already been mentioned several times that the strength of the light of the odic incandescence is greatest toward the poles, and least toward the middle in the magnetic axis. This is the case when the magnet is open ; but when the armature is applied, the luminous appearances are altered. I placed the armature upon a one-layer horse-

shoe before Josephine Zinkel in the darkened chamber. The first thing she remarked was, that this armature, which was previously only whitish, like all iron, and weakly illumined, became at once much more strongly lighted ; next, that the colour changed and divided into two, namely, into bluish and reddish. The side lying toward the north became reddish, that toward the south bluish. This experiment was repeated some months later with a five-layered horse-shoe, the poles being turned upwards. The same difference of colour was produced in the armature. The direction toward the west also produced this result. In like manner M. Sebastian Zinkel saw the armature red at the negative pole of the horse-shoe, and bluish-gray at the positive. This was repeated with Madame Bauer, Miss Winter, and others. Miss Sophie Bauer scarcely perceived the armature so long as it lay free ; but when I applied it to the poles of a horse-shoe, she at once saw it become illuminated more strongly at the two sides than in the middle. These observations are explained by the circumstance that an armature is not a mere conductor of magnetism, but that it becomes itself a magnet by the magnetic induction as soon as it is applied to the poles of another magnet, and that the poles of the two must be opposed to one another. This proposition, deduced from theory, here found its practical confirmation in the direct observation of the sensitive.

346. The effect upon the one-layered horse-shoe magnet was, that the poles immediately decreased in luminosity ; while light, which had been scarcely perceptible at the curve, increased rapidly considerably in strength, so that a kind of equalization of the odic incandescence over the entire horse-shoe resulted, with distinctly predominant brightness at the curvature. The bluish incandescence of the negative limb, and reddish of the positive, now reached, in almost uniform distribution, down to the curvature, and appeared almost to touch at the point of transition. Even

the curvature itself now shared in these disturbances of colouring. Its two halos, red and blue, were subjected to the same influences as the corresponding limbs, and were charged in the same way as their like poles. Repeated another time, for control, with a five-layered horse-shoe magnet, the open poles, originally far surpassing the curvature in odic incandescence, became more dull through the application of the armature, while the curvature became brighter than the latter. M. Delhez saw the polar region of the two limbs of an open horse-shoe magnet much more brightly incandescent than the curvature ; but when I applied the armature the light became much more equalized over the whole horse-shoe, without, however, becoming perfectly uniform. These statements agree well with the theoretical notions which we form of the processes. The accumulation of the magnetic essence at the poles is relieved by the armature, and thus is allowed to become in some degree equalized throughout the space of its field of action.

347. As to the *intensity of the light* of these odic luminous phenomena, its distribution over the different parts of the magnet is not constant, but exceedingly variable,—so far, on the one hand, as the terrestrial magnetism, and indeed other agents also, such as the electricity of the earth and air, sunlight, human hands, and other neighbouring Od-emitting objects, more or less affect it ; on the other hand, as magnetism and Od are distributed in unequal accumulations in the parts of a magnetic bar, in consequence of their peculiar attractive or repulsive forces. All these influences act, sometimes in one, sometimes in another direction, more or less dislocating the odic poles and the focus of their luminous forms. To calculate all the factors interfering here will not be a light task in any time to come. Nevertheless, I have collected a few observations, and will set them down here.

348. Madame Cæcilie Bauer saw a number of magnets

lying upon a table in the dark, but found the strength of light of their odic incandescence very unequal: she described many, at the first glance, as very beautiful and brilliant; others dim, obscure, and dull. I arranged them in a row, proceeding in order from the dullest to the brightest. Then I tried them by daylight. It was found that the strength of the light did not keep pace with the amount of weight the magnets of different sizes would support, but in all cases with the magnetic intensity. Simple horse-shoes, which acted upon a magnetic needle at a great distance, were more strongly incandescent than a nine-fold horse-shoe, which would support ten times the weight, but did not act upon the needle at so great a distance. *The intensity of the odic incandescence, therefore, kept pace with the magnetic intensity.*

349. All the sensitives who possessed any distinctness of vision saw the two poles of bar magnets more luminous than the axis. Misses Reichel, Weigand, Atzmannsdorfer, Glaser, Madame von Varady, M. Rabe, Baron August von Oberländer, Baroness Natorp, M. Anschütz, and others, saw this with the greatest clearness.

350. The same was the case with the horse-shoe magnets. Among the observing witnesses for this I find marked in my papers are M. Delhez, Madame Josephine Fenzl, Madame von Peichich, Misses Sophie Pauer, Ernestine Anschütz, Weigand, Glaser, Baroness von Augustin, Madame Bauer, M. Sebastian Zinkel, Dr. Nied, Baron von Oberländer, Madame von Varady, M. Johann Klaiber, Prof. Ragsky, and M. Hochstetter. All agreed in this,—that in an *open horse-shoe magnet* the limbs are most luminous near the poles, and dullest at the curvature, towards which the odic incandescence gradually decreases. Madame Josephine Fenzl observed this on a simple pocket horse-shoe, on a five-layered and on a nine-layered magnet; Madame Bauer on a single-layered; Miss Pauer on a three-layered and a

pocket horse-shoe magnet ; Klaiber and M. Hochstetter on several horse-shoes.

351. I showed to Madame Bauer, Josephine Zinkel, Baroness von Natorp, Madame von Tessedick, Madame Kienesberger, Baroness von Augustin, and Johanna Kienast, in the dark, a large *electro-magnet* produced by a voltaic element. Here, also, all found the open poles more brightly incandescent ; the curvature, indeed, luminous, but with far less strength.

352. The condition was altered when I closed the *magnet with the armature*. All the witnesses just named then immediately saw the strength of the light diminish at both poles, and rapidly increase at the curvature ; while the intensity of the light over the entire horse-shoe, including the armature, was simultaneously exalted, and in some degree approached to an uniform distribution through the magnetically-acting mass. In most cases this went so far that the curvature surpassed the poles in luminosity in particular. Miss Pauer, the girl Zinkel, and Madame Josephine Fenzl, decided most absolutely that there was stronger light at the curvature. The experiments were modified and frequently tested on the two latter with three-fold, five-fold, and nine-fold magnets.

353. At the same time the odic incandescence was heightened in the armature also, brighter at both ends when it lay upon the poles, duller in the middle, between the two poles, where it was free. Miss Sophie Pauer and the girl Zinkel saw, in some cases the poles, in some others the armature, most brightly illumined. Madame Kienesberger, Baroness von Augustin, and Miss Atznainnsdorfer, saw the poles brighter than the armature in all the cases submitted to them. It appeared to me as if, in all cases where the armature was sufficiently polished, and fitted the ends of the poles well, thus offered many points of contact, the poles were duller, and the armature brighter, and this inasmuch as it then conducted the magnetism better and more

perfectly ; thus, more completely and rapidly removed it from the poles. The more rapid the conduction, the duller the poles ; the slower the conduction, the greater the accumulation of magnetism and Od at the poles, and therefore the brighter there : the light of the armature is probably always the same, but is in some cases surpassed by the poles ; in others, the intensity of the light at the poles is inferior.

354. When I closed a horse-shoe magnet with another one instead of an armature, the results were modified in some degree. The curvatures of both rapidly became brighter than when they were open, and the poles more dull : but this did not go so far as that the curvatures surpassed the poles in intensity of light ; the four combined poles had rather the preponderance of brightness. This was seen by Miss Sophie Pauer and the girl Zinkel, both perfectly healthy, exact, and trustworthy observers. While in the magnets closed by an armature, the curvature had acquired the greatest proportion of light ; here, in those closed by another horse-shoe, the poles always retained it.

355. The reason of this difference may be conceived. When two horse-shoe magnets are joined, double the quantity of magnetism and Od must be at once conducted through each. Moreover, a greater quantity of magnetism becomes induced and put into activity by the opposition of the poles. Therefore there is, on the one hand, a far greater quantity of the dynamic brought into the circuit ; while, on the other, the channel for this is obstructed, since iron is a much better conductor of it than the hardened steel, endowed with so strong a coercive power : now an armature is made of iron, while a horse-shoe magnet is made of hardened steel. Then the armature is also ten times smaller than a horse-shoe ; thus, rapid conduction can take place through the former, it being ten times slower through the latter. Thus, a much greater quantity of the dynamic

essence must pass through a much less easy path when a horse-shoe is closed by another horse-shoe, instead of an armature. The consequence of this is that the dynamic, partially obstructed in its conduction away, becomes concentrated around the poles, and thus becomes more clearly evident there by odic light. This state of a certain degree of limitation approaches to the totally arrested, namely, that when the horse-shoe is not closed at all: and we saw there that the light of the poles is the greatest, and always surpasses that of the curvature in strength. All this, therefore, agrees very well with theoretical deduction.

356. We have already seen what a powerful influence the position of the magnet, as to north or south, exercises over the *colours* of the odic incandescence; it affects in like manner the *degree of intensity of its light*. All the sensitive found every *magnetic* bar, lying conformably, in the meridian, incomparably more brilliantly luminous at the two poles, than one lying unconformably, in which the odic incandescence appeared dull and troubled. The terrestrial magnetism and the Od of the terrestrial poles co-operate in the one case, and thus strengthen the odic emanations; in the other, they are adverse, and weaken them, thus interfering with the double force of the earth. This simple case has been repeated so many hundreds of times, and so often occurs incidentally to other experiments in the course of these pages, that I will not waste room by special enumerations here. It is somewhat more complicated now and then in the application of *horse-shoe magnets*; we have already examined them in the open condition in respect to this, when speaking of the colours (§ 338): I will here relate the experiments which I made in a similar manner with horse-shoe magnets closed by their armatures.

A. *When an armed horse-shoe lay in the meridian, with the poles turned to the north, the northward limb was brighter, the southward limb duller. When in the reverse*

position, with the poles *toward the south*, the intensity of the light was distributed in the reverse way in the limbs ; the southward was brighter, the northward more dull.

B. When a horse-shoe stood erect, armed, the limbs conformable, *with the poles turned upward*, Josephine Zinkel found the poles become bright in the dark, the curvature grow dull.

C. When the closed horse-shoe, in the conformable position, was turned the other way upward, so that the *armed poles were directed downwards*, and the curvature upwards, the points of most intense light were changed. They left the vicinity of the poles, and established themselves at both-sides near the bend, just where the curvatures began. Thus, that part of a closed magnet which was *turned downward* (whether pole or bend) was *somewhat less luminous, while that turned upward was always somewhat more so.*

D. When an armed horse-shoe lay, with the limbs conformable, in the magnetic parallel, Josephine Zinkel saw in the dark that when the poles were turned toward *the east* they became more dull, while the curve became brighter. But when I turned the horse-shoe round, and directed the poles toward *the west*, she saw them become brighter, and the curve duller. Thus, that part of a closed magnet *which was turned toward the east* (no matter whether curve or poles) *was less luminous, while that turned toward the west was always more so.* She also perceived the armature to be brighter when lying in the west, duller when in the east, conformable to its substitution for a curvature. Taken together, therefore : *The bend and poles of an armed horse-shoe magnet were more luminous when they were turned upwards, toward the sky or toward the west ; the luminosity was weaker when they had the direction toward the ground or toward the east.* (Vide § 536.)

357. These experiments were repeated at various times with simple and compound horse-shoes, and the results

always described in the same way by the beholder. At the last time of trial she added a new, but slight distinction, namely, when the poles of the horse-shoe lay to the east, she found the *north limb lying on the north side somewhat duller*, and the south limb, on the south side, brighter; on the other hand, when the poles were turned toward the west, she found the *north limb lying on the north side brighter*, and the south limb lying on the south side duller. Neither distinction was great, but still quite evident. These distinctions are in all cases delicate, and require for their examination good, quiet, and exact sensitives, and still more, a truth-loving, unprejudiced, careful and patient physicist. Persons with whom dogmatism is better than truth, who preconceive an opinion and seek to obtain a triumph for this over all others, are not fitted for such investigations; they entangle a matter so delicate, and tear the intermingled threads instead of separating them.*

* Thus it happened in Vienna. It was thought to make an end of the troublesome Magnetism with one blow. Finding a suitable opportunity, all the medical men who had pronounced themselves quite unfavourable to it, collected together, and called themselves a Commission of the Medical Society, and began a presumed annihilation of it. Even the title of the Commission was an assumption; for the Medical Society did not commission any one,—in fact, had no knowledge whatever of the matter; nay, having heard of it at last, after the irregularly-effected insertion and printing in the “Vienna Medical Journal,” the Society formally disclaimed it in the Report of the Meeting of the 16th of November, 1846, denying any share in this one-sided and arbitrary conduct of certain of its members. I myself, although an honorary member of this Society, heard of it accidentally long after, when many trials had been made with Miss Reichel. Indirectly, and under cover of some apparent civilities, my treatises were made the objects of attack: but near as I was, it was not thought fit to invite me to the trials; it was feared that I might in some measure solve and correct the contradictions and incongruities of their labours. But it was not explanation and scientific truth that were wanted here; only dogmatism in the opinions of a coterie of practising physicians. An impartial commission, chosen by scrutiny, by and from the Medical Society itself, to represent,

358. When I closed a *horse-shoe magnet again with a horse-shoe*, instead of an armature, like poles being brought together, the results of the odic incandescence were again somewhat different. The poles at once became more dull, and the curvatures brighter, than they had been before ; but Josephine Zinkel saw the limbs of both horse-shoes, when lying with their longitudinal direction conformable, in the parallels still always somewhat more brightly incandescent at the four poles than at the two curvatures. On both sides, the light was *strongest one-seventh part of the distance inward from the poles*, running on in decreasing amount to the curvature. Thus, the poles had lost less in incandescence toward the curvature, than when the magnet was closed with the armature. In a subsequent experiment, she compared the luminous condition of the many-layered curvature to a white jelly ; that is, the translucent white odic incan-

by *competent persons*, all different opinions, would have been a very good and praiseworthy thing, would doubtless have brought valuable truths to light, and established them by its weight ; a one-sided, party club of mostly young, almost wholly uninformed persons, interested in their views of the question at issue, had no authority, and deserved none. I shall throw some light upon the value of their labours here and there.—*Author's Note.*

If the Baron required analogies to assure him of the identity of feelings prompting the actions of medical practitioners, we could afford him not a few specimens from our London physicians, surgeons, and apothecaries. The philosopher, in his capacity of human being, may occasionally find himself stung and teased by the conduct of men of paltry habits and unworthy feelings. His contempt for the opponents of truth should, however, melt into pity, and, instead of regarding men as reptiles and vermin, he should deplore the existence of those repulsive agencies in their brains which incapacitate them for the more transcendental thoughts and enjoyments of science. Empirics by habit, how can they at once emerge into the higher grade of thinkers ? The Baron, whose discoveries are leading to a more expanded mental philosophy than any hitherto conceived, can afford a large charity towards those who oppose themselves to the progress of enlightenment.

descence of the steel substance resembled in the dark a transparent luminous jelly.

359. When I pulled the horse-shoes asunder, all the poles became brighter, but soon reassumed their natural luminosity, and the curvatures recovered their dulness. This was confirmed in all experiments, made at far distant intervals.

360. I obtained greater distinctness and corroboration of the foregoing when I

closed the horse-shoe, not with the poles of another, but with its curvature, as in Fig.

13. The result on the horse-shoe lying flat was exactly as when I had closed it with an armature: duller poles and brighter curvature downward until the poles made the arming, as in Figure 14, I again obtained brighter poles and a duller curvature on the horizontal magnet. Both phenomena are confirmations of the above-mentioned observations, and were gone through three months later with Josephine Zinkel.

FIG. 13.

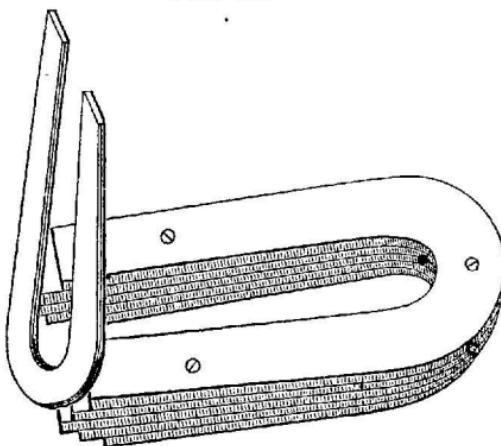
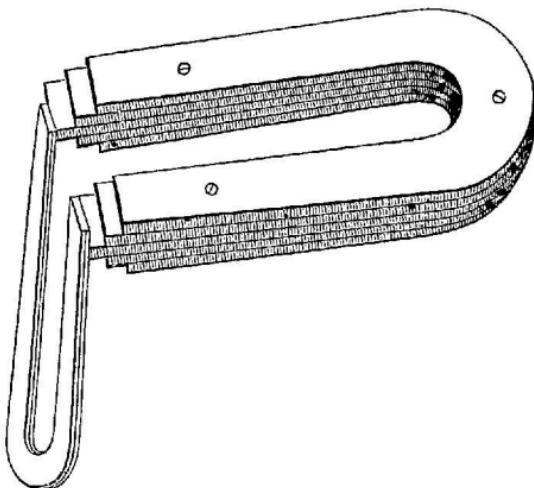


FIG. 14.



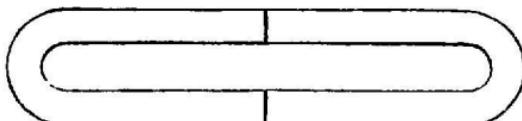
361. The cause may be traced back to two reasons. One is the shorter road, which the magnetism or the Od has to

take in its circuit when it is closed by a curvature instead of an entire horse-shoe; the other is the stronger mutual effect and greater quantity of magnetism, which are set in action and circulation by the conjunction of two magnets, where the magnetism is then more accumulated at the poles, and, on account of its greater quantity, cannot be conducted away so rapidly, which finally also leads on to diminished conduction. And since the Od advances somewhat slowly through matter, this strengthens the theoretical probability. However, it is not yet time for this; we will first merely collect and arrange facts.

362. The delicacy of the distinctions which may exist in these subjects is proved by the further remark that the observer could also detect a distinction in the degree of strength of light where the limbs of both horse-shoes were placed together so as to form straight lines, as in Figure 15; or when they were in contact at right angles, as in Figure 14.

In the first case she saw
the poles glow some-
what more brightly, in
the second more dimly;
while the curvature was

FIG. 15.



rather brighter. It must, in fact, be assumed that when attached in a line, the two horse-shoes exerted greater provocation upon each other than when they made an angle together, and the directions of the force crossed. The rectilinear protraction of the magnetic bars by their odic flame shows that the projectile force is propagated in a straight line in the direction of the bars and limb.

363. Let us now turn our attention to the course of the intensity of the odic incandescence on the *other horse-shoe*; that *used as the armature*. When its curve was placed against the poles of the horizontal magnet, as seen in Fig. 13, though previously scarcely perceptible to Josephine Zinkel in the dark, it rapidly became odically incandescent, blue on

one side, red on the other. At the same time, its poles above glowed more brightly. As I now drew it slowly down the poles of the horizontal horse-shoe, the curvature gradually became still brighter, while its poles became step by step more dull. When I at length brought the poles to the poles, as in Figure 14, the curvature attained its greatest, and the poles their least brightness, although they still remained always tolerably strongly luminous ; and then the curve was brightest, the poles less brilliant, the limbs dullest, yet the first never so bright as when the poles were closed by an armature. All this agrees exactly with the various observations related in the last paragraphs.

364. The intensity of the odic incandescence also showed differences at different points of the steel magnet, even at equal distances from the poles. Madame Johanna Anschütz, Misses Atzmannsdorfer, Winter, Weigand, Nowotny, Glaser, Reichel, and others, always saw the *edges* more luminous than the surfaces of steel bars ; all *corners* again more luminous than the edges ; and *all* points still more so than mere corners. This they found to be the case also in the applied armatures ; the edges and corners were always brighter than the faces : indeed, they often saw the edges emit light when the surfaces were still dark and invisible. I showed Miss Atzmannsdorfer, in the dark, a magnetic bar twenty inches long, brought into a narrow parallelogram, and thus closed by means of three armatures ; she saw the entire quadrangle emit light, the magnetic bar more strongly than the armatures, but all seamed round, as it were, at all the edges, with threads of light. The healthy Miss Pauer, M. Rabe, Sebastian Zinkel, and others, described the same thing many times. Madame Bauer saw a one-layer horse-shoe more strongly and brightly seamed when it was open than when the armature was applied, on which the threads of light round the edges at once became duller. She perceived the seams both on the inner and outer edges of the horse-shoe,

but the outer were lighter than the inner. Moreover, she found them brighter on the positive than on the negative limb. The girl Zinkel described these phenomena most accurately. I showed her a one-layer and a three-layer horse-shoe, each both open and closed with the armature. She saw the *single-layered, when open*, bounded by a seam of strong light at all the edges ; the seam of the outer edges was lighter, both around the curvature and at the poles ; so that in the open, single-layer horse-shoe, the greatest intensity of light ran round the outer boundary edges. When the *one-layer was closed*, it was likewise seamed with light on the inner and outer edges. But in this case the edges of the curvature were somewhat lighter inside than outside ; but this greater light vanished by degrees towards the poles, and gave way to another similar, which now displayed itself on the edges of the limbs, and attained its maximum of light about a seventh part of the length of the limb below the poles. On the *three-layer horse-shoe, when open*, the border of the inside of the curvature was always brighter, decreasing and disappearing toward the poles ; and here again the outer edge poles acquiring the greatest light, instead of the curvature. When the *three-layer was closed*, she saw all its outer edges more brightly seamed than the inner, even on the outer edges of the armature. We must not forget here that the three-layer horse-shoe is only armed on the middle layer, and not on the two shorter side layers ; this gives rise to the differences in the strength of light of the seaming between this and the one-layered magnet. She always saw every armature with lighter seams on the outer edges, and duller on the inner.

365. From the foregoing may be deduced the rule that the seams of light at the edges are *more intense* when the magnet is open, and its odic tension throughout the entire mass of steel thereby (probably) exalted ; on the other hand, that they decrease in intensity of light outside when the

magnet is armed, their odic tension being lowered, and the dynamic activity set in motion, thus turned more inward, so that the *seams of the inner edges then increase in intensity of light.*

366. Madame Jos. Fenzl, Madame Bauer, Madame Kienesberger, Sebastian Zinkel, and Wilhelmine Glaser, stated that the *most brightly luminous place*, both of bars and open horse-shoes, was always a spot, not on the poles themselves, but some distance down from them, about *one-seventh of the length of the limb toward the axis.* This was the case with magnets, open or closed by armatures, magnets closed by magnets, or any other arrangement; when they were closed, the curvature as a rule was brighter than the poles, but the spot always remained brighter than the curvature. It is a well-known fact that the focus of the magnetic attraction is situated exactly at that point: thus this magnetic point and the focus of the greatest intensity of odic incandescence coincide. Josephine Zinkel observed a remarkable case of change of position of the brightest spot of light. When I had placed a horse-shoe, closed by an armature, in the vertical position, but with the armature and poles downwards, and the curvature upwards, these maxima of light lost their position near the poles and changed to the curvature, to both sides of this, at its junction with the limbs, that is, about one-seventh of the distance down from the curve, which here took the place of the armature. When I closed one horse-shoe magnet with another, the phenomenon appeared at the poles of both magnets, about one-seventh inwards upon each, and, indeed, more distinctly here than when the armature was used, for the poles thus closed remained brighter near the curve. This even passed into unmagnetised iron bars; when they had become magnetic by induction, the girl Zinkel always saw the focus of light one-seventh of the half-length inward from the poles towards the middle.

367. *An artificially excited, very bright point of odic incandescence, is produced by rubbing one magnet with another.* At these points, namely, where the poles of the rubbing magnet come in contact with the rubbed one, each time, a very intensely luminous spot is formed on the latter, which moves forward over it very exactly with the former. The point of the rubbed magnet which is touched is set in luminous odic incandescence by the rubbing ; but this is extinguished again as the rubber advances, and goes on along with this. This observation was repeated, with many modifications, with Josephine Zinkel.

368. But every other od-emitting object produced similar effects. When I slowly drew the point of a crystal of chrome, alum, arragonite, rock crystal, or heavy spar, over the surface of a magnetic layer of steel, the parts touched became much more strongly odically incandescent, to a diameter of two to four-fifths of an inch. Nay, even human hands were capable of producing this phenomenon. When I laid my right hand on the curvature of a horse-shoe, and moved it along toward the southward pole, a luminous patch was produced on all parts when I touched the iron, advancing along with my hand. The same occurred when I drew my left hand along the northward limb. The girl Zinkel was a frequent witness of this ; but Wilhelmine Glaser, Dr. Nied, and Madame von Pischich-Zimanyi, also saw these illuminations with full distinctness. Anka Hetmanck saw it on a steel magnet. When I placed a pocket horse-shoe magnet, which the beholders saw in strong odic incandescence at the poles alone, upon the flat hand of Miss Sophie Pauer, moreover of Miss Weigand, of Josephine Zinkel, of Wilhelmine Glaser, and of Madame Cæcilie Bauer, they saw the whole of the steel slowly increase in brightness, and in the course of a few minutes rise to a full odic incandescence. We shall hereafter meet with corresponding effects of the magnet upon other luminous bodies.

369. *Heat* did prove to me a means of aiding the odic luminous phenomena. I laid before Miss Sophie Paner and Wilhelmine Glaser, small magnetic bars and horse-shoes, which they saw incandescent, and emitting flame well, while cold, and then placed these upon the heated stove in the dark chamber. When they had acquired about the heat of one's hand, both observers found that the incandescence had become much more cloudy and dull. Josephine Zinkel saw a large horse-shoe magnet gradually lose the brightness of its incandescence as it became warmer; and when I had heated it to about 167° Fahr., the odic incandescence had decreased considerably; but it was recovered as I let the armed horse-shoe cool. We know that magnetic intensity exhibits a similar course under like circumstances; therefore the intensity of odic light, as it appears, is here parallel to magnetic intensity.

370. When I brought a steel magnet into the *electrical atmosphere* of the conductor of a machine, at a distance of forty inches, the length of the sparks being equal to two inches, the odic incandescence increased considerably in strength of light, even when it was not isolated, but merely held in the hand, or placed upon a table; and this was increased in proportion as the magnet was brought nearer to the conductor. Whether it at last became actually electrified itself, or not, its luminosity did not perceptibly alter further. This is according to a series of experiments which were made on Josephine Zinkel. They were gone through with short bars, with longer, and with one five feet long; then with smaller ones, as well as with a large nine-layer horse-shoe; and then with weak and strong electric charges.

371. It seems to me that the *influence which electricity exerts, and this merely by means of its atmosphere, upon the odic polarities*, deserves greater attention, so far as it is exhibited in the colours of their incandescence; when, for example, I turned the northward, negative, blue-glowing

side of a magnet, no matter whether bar or horse-shoe, to the positively charged conductor, the intensity of the light was exalted, the blue became brighter. When I turned the magnet round, and directed the *southward*, positive, red, lighted side, to the positive conductor, not only did all the red quickly disappear, but it shortly turned into blue. *The odic polarities were reversed*; the + Od turned toward + E, was converted into — Od, and in correspondence with this the blue — Od of the distant side of the magnet was changed into red-glowing + Od. The Baroness von Augustin witnessed this in addition to Josephine Zinkel.

372. I reversed the experiments by electrifying the conductor negatively. It now acted in the reverse way upon the odic poles of the magnets. It changed the od-negative, blue-glowing pole, turned towards it, into a red-glowing; the od-positive pole, at that time turned away from it, into a blue-glowing, od-negative, all at the distance of forty inches. But so soon as I ceased to electrify the conductor, only a few seconds elapsed before the poles on both sides became pale, and returned into their original polar colours of odic incandescence, corresponding to the magnetic polarities of the bar. I could repeat this play of alternations at will, backwards and forwards, in a minute each time. Thus the power of electricity, by its mere atmosphere, and unisolated, was shown to strengthen considerably the odic polarities of magnets when placed conformably, and at once to reverse them temporarily when placed unconformably.

373. Since every one, who is at all acquainted with these branches of physics, is aware that the magnetic poles of a magnet are not subject to reversal under these circumstances, it will be almost unnecessary to detail the experiments which I undertook to attain the very fullest conviction, from facts, of the accuracy of this truth. Since the approximation of another needle could not be decisive

here, inasmuch as it would itself become suspected of induction, I took another path. I appended a little bar to the further end of the twenty-inch long bar in such a way that, being attached to the outermost point, it could only just hold on, and fell off on the slightest shaking of the floor of the room. If the force by which it was held up had diminished in the least, it would, necessarily, have fallen off, long before this sunk down to nothing. Now this decrease, and final entry into a condition of indifference, must have occurred if there had been a reversal of the poles. I now charged the conductor and discharged it again ; the odic incandescence of the rod was slowly changed now into the same direction as the electrical atmosphere ; now into the direction of the original magnetism, repeatedly, but the little bar did not move, much less fall off. Thus the magnetic polarity of the bar did not undergo any perceptible change, while the odical polarity, as evinced by the colours of the incandescence of the poles, changed completely.

In these facts exist the strongest proof of the difference between Od and magnetism, since they afford cases in which the two appear in diametrically opposed polarities in one and the same iron bar. More on this point will follow in the section on odic flame.

As the armature becomes incandescent by induction, it also becomes an *electro-magnet* by induction. I connected a soft iron horse-shoe, the limbs thirteen inches long, and one inch and a half in diameter, wound round with a copper wire, four lines thick, with a little pile of six zinc and silver elements of Smec's battery, each having sixty square inches of surface. All the sensitives to whom I showed this in the dark, in particular Madame Kienesberger, Anka Hetmanck, Josephine Zinkel, Stephen Kollar, Madame von Tessedick, Professor Endlicher, Madame Josephine Fenzl, M. Delhez, &c., saw the iron, as well as the armature when I applied this, immediately become more or less odically incandescent.

The open poles glowed most strongly, decreasing gradually downwards to the curvature. The colour of the incandescence was bluish at the negative northward pole, reddish-yellow at the positive southward pole, exactly as in the steel magnet when acted on by rubbing. When the armature was applied, it exhibited contrary colouring, red at the northward pole of the magnet, blue at the southward; it had thus become an induced magnet by the induction of the other induced magnet.

375. And not only did the iron magnet thus produced become incandescent, but the other parts of the apparatus hereby thrown into the magnetic condition with it, namely, the copper coil, even the conducting wires, and finally the battery itself. I merely mention this here to make the Section on the odic incandescence complete. I must leave the detailed account of it until hereafter.

376. Even *an empty iron bar*, although independently constantly glowing weakly, as all bodies do more or less, is not insensible to the influence of difference of position toward the meridian on its odic incandescence. Josephine Zinkel saw an iron bar twenty inches long, which I brought to her in the meridian, increase in odic incandescence, becoming bluer toward the north and more reddish-yellow toward the south. When I now turned it round, the colours were reversed, so that the half turned toward the north always remained bluish. When I set it in the erect position, contrary to all expectation, she saw it, at the distance of a yard, a blue-grey incandescent above and whitish-red below. (These apparent anomalies will be discussed hereafter.)

377. We are already quite aware, from my earlier treatises, that the magnet possesses the capacity of imparting its indwelling odic force to other bodies. But that its power *to produce odic light* was at the same time *transferred to other bodies*, was first discovered by subsequent researches,

Madame Kienesberger, Miss Atzmannsdorfer, Wilhelmine Glaser, Zinkel, and Friedrich Weidlich, went through a variety of experiments, in which I brought on to flaring magnet poles iron and copper wires twisted together into flat coils, with one end projecting out about four inches. These wires immediately absorbed the odic flames, and themselves *at once acquired a greatly exalted odic incandescence*. Further on, § 485, when giving the details respecting odic flame, I will give a circumstantial account of these experiments. Glass objects also, large lenses, the bells of an air-pump, acquired odic incandescence when placed upon the poles of strong magnets. See § 481.

378. If we now briefly sum up what has been stated concerning the odic incandescence, we obtain the following compressed *résumé* :—

a. The peculiar light, the odic incandescence, of all magnets, whatever shape it may possess, appears in the dark dull gray in the lowest degrees of luminosity ; it then rises progressively towards whitish and yellowish, and generally assumes a bluish colour at the northward pole, and a reddish at the southward.

b. This colouring is modified through a great number of shades, according as the poles of the magnet are open or closed, conformable or unconformable, turned to the east or to the west, upwards or downwards, *i. e.*, according to the different conditions under which its conflict with the terrestrial magnetism takes place. But it always follows a law which gives the rule of action in each position, and in every case makes good its influence.

c. An electro-magnet obeys the same law in all essential particulars.

d. A bundle of bars or horse-shoes which are placed with like poles together, becomes reversed internally into unlike odic poles.

e. The armature shares in this process ; it acts passively

and actively as an induced magnet, and modifies the phenomena of light and colour.

f. An empty iron bar plays the part of a terrestrially induced magnet, and gives the corresponding phenomena of odic incandescence.

g. The intensities of odic incandescence keep pace with the magnetic intensities in one and the same magnet. They exhibit variations of magnitude among different magnets, and in each particular magnet itself, and this according to their position, as they are open or closed, or have the poles directed conformably or unconformably towards east or west, upwards or downwards. They change their positions on the poles and axes of magnets according to these circumstances. The light is strong enough to bear reflection from common mirrors.

h. Magnets closed with magnets instead of armatures have the lights of the odic incandescence displaced according to the same laws, but in a different way.

i. Wherever magnet poles are applied upon magnetic bars, they produce partial exaltation of the odic incandescence, spots of light. Crystals and hands do the same.

k. The electrical atmosphere causes exaltation of the odic incandescence.

l. It acts so strongly upon the odic light, that it is capable of producing a reversal of the odic poles where no change of the magnetic value occurs.

m. Heat weakens the phenomena of odic incandescence in steel magnets.

n. The odic incandescence is capable of being transferred from magnets to other non-magnetic bodies, copper wires, &c.

o. Although the odic intensities rise parallel with the magnetic, the values of the two do not; cases often occurred where + M appeared combined with - Od, or - M with + Od; and these contrasts strongly testify to the difference existing between them.

II.—ODIC FLAME ON STEEL MAGNETS.

379. THE odic flame which issues from magnets always keeps pace with the odic incandescence. It forms the second degree in the scale of strength of the odic luminous phenomena, and consists of a brightness which the weaker sensitives only see as a luminous halo over the poles of the magnets, but which, to those more highly sensitive, assumes progressively more of the external aspect of a real flame, in proportion to their power of vision, and is described by them as such. There are incandescent magnets without visible flame, but no odic flames without visible incandescence. The incandescence is always the first appearance of light. I had once a horse-shoe magnet which had become so weak that it would no longer support its armature, although it was still perceptibly magnetic. I showed it to Josephine Zinkel in the darkened chamber, at a period when her power of vision had a high degree of sensibility. She saw the whole mass of steel lighted with odic incandescence, but could distinguish no flame at the poles, only a little smoke. When the odic intensity was increased, the flame became visible. It exists, as we are justified in assuming, *everywhere*; but we can only speak of it where it becomes visible. We will follow its appearances, so far as I have been able hitherto to make out its traces, beyond what has already been told, by running through the series of experiments upon magnets which I instituted for this purpose.

380. We have in the first place to take up the thread of the details given in the first of these treatises, from § 3 to § 20, to which I refer the reader. A year later, namely in 1845, I went through a series of investigations with Miss Reichel, while she was residing with me, which served both to confirm what was before stated, and to unfold new matter

which must be appended to the former. She saw all magnets, without exception, furnished with flames of different size and intensity of light ; the former according to the different sizes of the magnets, the latter according as they possessed different strength of magnetic or odic charge, as well as proportioned to her power of sensitive vision, more exalted or more depressed by fluctuations of her disease. I shall here select only a few out of hundreds of experiments. Late in the summer, when she is usually somewhat better in health, she saw a weak bar, twenty inches long, with a flame rather more than one inch long. At the same time she saw a seven-layered horse-shoe with a flame of eight inches at its poles. At a subsequent period, during more highly excited sensitiveness, the largest of my steel magnets, a heavy horse-shoe made of nine cast steel layers, was placed before her in the dark. This time, as in the year before, although she did not know of the magnet, she saw flames six feet high blaze up from both poles. They were so vast, that, as the horse-shoe had the poles turned upwards, the flames blended together, as they rose, into one column of fire. With regard to the different colours which were given out along each pole, she perceived that the column of light was composed of two trunks, one yellowish-white, the other bluish ; the first smaller, the second larger. The entire chamber was so strongly lighted by it that she could detect the outlines of every object. All the space between the white odically incandescent limbs was full of streaks of flame, and the outside of the steel was enveloped in a luminous mist, which seemed to flow onward in waves, sometimes towards one pole, sometimes towards the other. At the ends of the layers, their edges and corners, where they formed the polar ends, special little flames streamed out sideways, strongest from the outer angles, when they finally terminated in isolated spreading sparks. Since all this agrees exactly in every particular with what Miss Reichel

had described a year before, on a smaller scale, of a weaker magnet, I showed to Miss Atzmannsdorfer, after her observations and the descriptions were completed, the drawings which are appended to the first part of this work. She found all to agree pretty exactly with what she herself had seen, and thus confirmed the accuracy of my earlier researches. She added only, in correction, that the flame-like phenomena were in reality all much more delicate and lighter than those represented in the drawing, but at the same time moving about, uniting together, and intermingling with varying colours with every breath of air.

381. I have to state in almost the same words from a healthy patient, the girl Zinkel, what I have just communicated from a diseased sensitive. She also saw more distinctly, under certain circumstances, the odic flame flow from half an inch to four inches from bar magnets, and blaze from three to five feet high from the nine-layer magnet; among these circumstances was the occurrence of the catamenia. She then detected also the little lateral flames on the edges and corners of the bars, as well as of horse-shoes, the play of colours, the great illumination, the scattered sparks, all nearly word for word as Miss Reichel had described it two years previously.

It has already been mentioned, § 316, that the healthy Baron von Oberländer saw the odic flame as large over the nine-layer horse-shoe magnet. The same was said of Friedrich Weidlich, § 330, as well as at § 328 of Madame Kienesberger, at § 313 of the healthy sensitive Wilhelmine Glaser, § 315 of Dr. Nied, § 312 of the Baroness von Augustin, § 303 of M. Franz Vernolendt, § 299 of Madame von Varady, and only a little less strongly, § 309, of the thoroughly healthy Miss Sophie Pauer. *All these persons saw flames blaze up to the height of a man over the nine-layer horse-shoe magnet.*

382. Let us now examine some of the properties of

the odic flames of the magnet ; in the first place; *their extent.*

We have seen that the *size of the flames* depends objectively on the size of the magnet and its magnetic intensity or strength of change ; and that the perception and recognition of it is also subjectively conditioned by the excitability of the observer. As there exist among mankind, in respect to common sight, such great differences that one man does not recognise his brother passing by him, while the eagle eye of another enables him to count the sky-larks in the air ; as, moreover, there are some who cannot see at all in moderate darkness, while others can see their way in the darkest night ; as, in more striking cases, those suffering from hemiralgia can only see in the strongest light, and are quite blind in a dim light, thus directly opposed to the sensitive ; as there are albinos, and indeed such as cannot see colours, and to whom the world looks like a copper-plate engraving ;—so is it also with the power of seeing odic phenomena ; in proportion to their power of vision, the odic flames of one and the same magnet appear more extensive or more limited ; and this is not merely different in different individuals, but varies in one and the same on different days, at different hours, nay even most surprisingly from minute to minute, so that at three rapidly succeeding moments one and the same odic flame may be imperceptible, immediately afterwards visible, though small, and then, directly after this, large and expanded, without any change in the object, by mere change of the susceptibility of the observer. The cause of this will be made known circumstantially in the succeeding treatises, when we come to speak specially of the power of odic vision.

383. The perception of a sudden and rapidly vanishing flash of light when the *armature is pulled off the horse-shoe* quickly, constitutes the lowest degree of recognition of the odic flame upon magnets. This was seen by Dr. Nied,

Baroness Pauline von Natorp, M. Kotschy, Madame von Varady, M. von Rainer, Baroness von Peichich, M. Amalie Kreüger, Wilhelmine Glaser, M. Ernst Pauer, Prof. Endlicher, M. Delhez, Baroness von Augustin, as well as Miss Nowotny, § 3. Madame Cæcilie Bauer gave a more accurate account of this process. At the moment when the armature was pulled off she saw a sparkling flash of light, almost like that produced by flint and steel, disappearing instantaneously. The flame over the poles of the horse-shoe was not largest then ; on the contrary, smallest, and at the first moment almost imperceptible. Immediately on this it began to form, at first small, then increasing, and soon rising to its permanent magnitude. About a minute was required for this. Some months later I received exactly the same description of this phenomenon from Josephine Zinkel.

The different degrees of strength of the light from a mere halo to distinct flames, presented by the luminosity appearing at the poles of magnets, were described a little differently by almost every observer. We found MM. Hütter and Schuh, and Prof. Ragsky, at the bottom of the scale. Next to them stands Prof. Husz of Stockholm, who only saw the light over the electro-magnet. In the middle degree occurred the observations of Prof. Endlicher, among others, to whom the luminous emanations exhibited more general distribution and great substantiality ; then the physician Dr. Nied, M. Rabe, Baroness von Augustin, Miss Sophie Pauer, Baron Oberländer, Anka Hitmanck, and the painter M. Anschiitz. Above these stood Madame Cæcilie Bauer and Josephine Zinkel, and at the top of the series the somnambulist sensitives, to whom the lights over magnets always appeared as distinct flames.

384. Among the objecting conditions of the *magnitude of the odic flame, is the distinction between the northward and southward poles of the magnet.* The two flames are in most cases of different size ; at least in the 48° of N. lat., in

which my residence lies, when the horse-shoe stands upright, or when thin poles are turned toward the north, or when bars lie conformably in the meridian. It must be relatively different in other places. Under the tropics, the distinction in the conformably placed magnets will become imperceptible, and, in the magnetic equator, disappear altogether. On the other side of the tropics, *e. g.* at the Cape, at Van Diemen's Land, or in Buenos Ayres, these conditions will be reversed; the flames of the southward pole will have the upper hand in those cases where the northward pole prevails with us. When a bar magnet lies in the meridian, the northward pole turned toward the north, all my sensitives, sick or healthy, have, in innumerable experiments, found the flames of the northward pole larger than those of the southward pole directed to the south. Taking the mean of all the accounts, the difference amounted to about one-half, so that the northward flame was about double the length of the southward. I say, about; for the innumerable questions I put could not be answered in the dark according to a regular standard; in most cases they used the assistance of the span, and explained themselves by such terms as hand's length, hand's breadth, thickness of one's thumb, &c. And there is no occasion for great accuracy here, where, for the present, we are only seeking the general outlines of the phenomena. It is sufficient to say that the concordant testimony of all the sensitives gives the relation of magnitude of the northward flame to the southward as 2 to 1. This is in inverse proportion to the magnitude of the odic incandescence of bars, since in these the blue northward side is shorter than the red southward. (Still the latter may easily depend upon some deception; for the blue odic incandescence is much less luminous than the yellowish-red, and thus in the lower degrees becomes invisible to the eyes sooner, without being really shorter). To support this by the testimony of experiments, it would be necessary to call

over again almost all the persons named, which would cause useless diffuseness. I confine myself, therefore, to mentioning the healthy Dr. Nied and Baron von Oberländer, Madame von Varady, Madame von Peichich, Prof. Endlicher, M. Constantin Delbez, Baroness von Augustin, Miss Sophia Pauer, also Madame Kienesberger, Misses Atzmannsdorfer, Reichel, Weigand, Winter, and in particular the healthy and strong Josephine Zinkel, and the healthy Klaiba the joiner, on which latter I have repeated this experiment especially often.

385. The result is modified, though similar, when a *magnetic bar* lies not in the normal direction in the meridian, not conformably, but is placed in such a position that its northward pole is turned toward the south and its southward pole to the north; that is, unconformably. In this case the sensitives observe a diminution of the odic flames; they both become of duller aspect, less luminous, more dim, shorter and narrower, and moreover modified in colour. This is, on the one hand, deducible from the general theory of magnetism, and has also been observed in numerous experiments with Madame Kienesberger, Misses Atzmannsdorfer, Wilhelmine Glaser, Reichel, Winter, and Josephine Zinkel.

386. To these sensitives a *horse-shoe* was submitted in the same way, while lying horizontally in the meridian, as described above, § 338; that is to say, once with both poles turned to the north, another time with both toward the south. In the first position the northward flame appeared larger and more brilliant, while that of the south pole seemed diminished, of a dirty almost bluish red; in the second case the northward flame appeared dim, greyish-blue, with a tinge of yellowish, and diminished about one-third; while, on the contrary, the red was enlarged about half, enlivened and brilliantly red luminous.

387. When I placed an open five-layer horse-shoe magnet

vertically, the poles turned upwards, and the limbs conformably,—namely, in such a manner that the northward polar limb stood on the north side, and the southward polar limb on the south side,—the flames of both poles appeared to Josephine Zinkel vivified, large, and brilliant ; when I placed the limbs unconformably,—the northward polar limb on the south side, and the southward polar limb on the north side,—both flames were dull, diminished, dim, and discoloured.

388. When I turned a horse-shoe the other way upwards, in the same vertical direction, so that the poles were directed downward, suspending it by the curvature to a copper rod, and thus keeping it in the conformable position, the flames of the northward pole were shorter, those of the southward longer.

When I gave both poles the oblique direction of the magnetic inclination, the conditions were about the same.

389. Transverse positions of all kinds, where the poles were placed east and west, gave intermediate conditions with numerous modifications, in which, however, the relative sizes of the two poles exhibited less difference. And this in the following manner.

390. When the two poles of a horse-shoe lay to the west, the same observer described both flames as short ; when in the reverse position, with both poles toward the east, they were somewhat longer. But both parallel positions always possessed shorter flames than the vertical with the poles turned upwards.

391. The further observation comes under examination, that the flames appeared :—

At the northward pole, in the eastward direction, longer but duller.

„ „ in the westward „ broader but more luminous.

At the southward pole, in the eastward „ broader but more luminous.

„ „ in the westward „ longer but duller.

We shall see hereafter (§ 405, where we shall speak of the conflict between two odic flames,) what the conditions are of these distinctions of longer and broader, and then find the proof that the former belongs to an attraction, the latter to a repulsion of the odic flames ; and we may take this opportunity of anticipating the important discovery, which must be discussed more circumstantially elsewhere, that the *east stands in some degree on the side of the north, the west on that of the south, in their relations to Od*, vide § 536.

392. In like manner I tested, by numerous experiments on the highly sensitive, the influence which the *magnetic inclination must* necessarily have upon the character and size of the odic flames depending upon the steel magnet. Misses Atzmannsdorfer and Reichel, Madame Kienesberger, and the healthy sensitive Josephine Zinkel, took the greatest share in these. It was first seen that the experiments which I described in the first treatise, § 11, were not unconditionally but only conditionally correct. There, namely, I stated on the authority of Miss Reichel that the terrestrial magnetism does not appear to exert any important influence upon the size of the odic flame. This statement is correct, when, as happened in that experiment, the change of poles and inclinations is *effected rather quickly, and no time is allowed for the development of the polar flames.* At that time I was unaware of a certain degree of slowness with which nature effects the odic operations, for the full completion of which some little time—a half, a whole, or in many cases several minutes, are required ; on which point I shall hereafter find an opportunity to say more. When the experiments of § 11 were made with greater slowness, and subjected to examination, it was certainly seen that the odic flames altered, not only in size but even in form, according as the position assumed was larger or smaller, and that the terrestrial magnetism did certainly exert an influence upon it, which, though slowly, was most decisively and considerably manifested. The

suspended magnetic needle, as is well known, changes its position instantaneously whenever the terrestrial magnetism can exert influence on it ; and this influence shews its effect at once in its whole force. I was formerly led away by this usual manner of looking at it, but longer experience has taught me another in reference to odic effects, which only rise slowly to their maximum. When I subsequently modified the experiments with Miss Reichel in such a way that I no longer held the bar magnet in my hand, whereby the polar flames were complicated and rendered untrue, but fixed it in a wooden Guidoni's holder, and then brought it into the magnetic inclination, in which I let it remain a minute, I expected that the blue north polar flame would increase in size, strength of light, and in colour, and that the northern reaction which I had been previously acquainted with would necessarily increase in intensity of every kind. But the result did not in the slightest degree confirm my preconceived opinion. On the direct contrary, the beholder of the phenomena told me that the flame of the northward pole had acquired the very reverse colour, and decreased considerably in strength of light. The blue colour became dull, opaque, gray, and dwindled away till it was imperceptible. When I turned the steel round, and brought its northward pole into the opposite direction, in the inclination, seen at the *distance of a yard* and more, the flame appeared bluish, large, and vivid. The same experiment, made at a different time, with Miss Atzmannsdorfer, furnished the same unexpected result ; not only did not the northward flame increase in the inclination, but it disappeared in great part from her eyes : but when the steel was reversed the sensitive saw the bluish flame again of almost double size. Finally, I tested these most strange and striking results with the greatest exactness, in Josephine Zinkel, and devoted many days to a thorough investigation of them with her in the dark. Here also my experiments had the same result :

in the inclination, where it might have been expected that the flame of the north pole would appear at its maximum, it on the contrary sank down into a sort of minimum ; instead of rising to the most vivid blue, it lost all colour, and remained nothing but a dim grey. We shall see hereafter that these astonishing visual phenomena were perceived and confirmed in like manner through corresponding phenomena of sensation, by all the sensitives, even when of much lower degree of excitability. Since, then, this appears to be directly opposed to the attraction of terrestrial magnetism, by which, in our hemisphere, the negative pole of the needle, brought down to the direction of the inclination, is attracted, not repulsed, by the positive north pole of the earth, we see from this, as distinctly as from the preceding experiments, that the odic flame, or the odic phenomena in general, are indeed influenced by the magnetic attraction, but by no means unconditionally governed by it, and that the *globe contains other qualities acting upon Od and its characters besides magnetism.* I shall bring forward all that I have been able hitherto to make out on this subject in the details in the odic colours, § 489, &c. ; here, where we have merely to do with the effects of magnetism on the odic flame of the needle in the direction of the inclination, I am contented to announce the results.

393. When I applied horse-shoe magnets to these experiments the case was somewhat modified. If the two poles were turned toward the north, the blue flame of the northward pole appeared in its full length ; but the reddish flame of the southward pole seemed repressed, bedimmed, bluish-red, and diminished in size. On the other hand, when the poles were turned toward the south, the red flame of the southward pole was enlarged ; while that of the northward pole became duller, reddish-blue, and diminished in size. When the two poles stood directed upwards, the northward pole was strengthened, the southward pole

lessened (thus giving a new support to what was stated in the last paragraphs). Nay, this went so far that it afforded a circumstance worthy of notice in a practical point of view—namely this, that the odic flame of the unconformably placed pole was not unfrequently wholly repressed ; that is, became no longer perceptible to the eyes of particular observers, and thus made it appear as if only one pole possessed an odic flame. My note-books swarm with indications of this case, and there was scarcely one of my numerous sensitives to whom it did not frequently occur under the proper circumstances, especially those of weaker power of sight, or in imperfect darkness, or when the observing person had not remained long enough in the dark. As witnesses, I mention the Baroness Natorp, Miss Dorfer, Madame von Tessedick, Madame Fenzl, Miss Sophie Pauer, MM. Hochstetter, Fernolendt, and the chlorotic Hetmanek.

394. There was a difference produced in the size of the odic flame, whether a magnet stood free with the poles in the air, or lay flat upon a table. In the latter case, all the observers perceived the flames observably larger, sometimes expanded to twice the size. Wilhelmine Glaser saw the flames of both the poles of a bar become as long again upon a table of polished walnut wood. Miss Sophie Pauer looked at magnets upon an unpolished deal table ; they formed a long stream of light flowing in waves upon it, at the southward pole shorter, thicker, and red ; at the northward, long, slender, and blue. The waving motion could be seen most distinctly in profile ; when seen from above, it enveloped the poles like a halo, which also rose up in the air immediately above them. Madame Cæcilie Bauer and Josephine Zinkel, especially the latter, were frequent witnesses of this phenomenon, according to which it appears as if the table formed a kind of fixed point whence the odic flame flowed forth.

395. The results remained the same whether I applied

the largest, the middle-sized, or the smallest magnets, even such as might be hidden between two fingers. The phenomena were, indeed, on a proportionately smaller scale, but remained exactly the same in kind. Thus, immense masses are quite unnecessary here, for very much can be done with small instruments, and with these the greater part of my observations may be repeated and confirmed on a small scale. *A small magnet charged to saturation appears to possess as much odic tension as one out of all proportion larger.* The luminous phenomena occur in a more limited space, but the effects remain qualitatively the same.

396. The same phenomena of which I have already given an account at § 340, &c. when speaking of the odic incandescence, and to which I must refer for the sake of brevity, namely, the *banded colourings*, occur also with the odic flame on compound bar and horse-shoe magnets. The middle layer of a nine-fold horse-shoe magnet emitted blue flames at the negative pole ; the pair next to it in front and behind, gave out red ; the second pair blue again, the third red, and the fourth and outermost blue. The red flames of the two enclosed red layers were here somewhat repressed, especially when placed with the northward side toward the north. All these phenomena were repeated with the reversed arrangement of colours at the southward pole ; and here the two enclosed blue layers had repressed flames which looked rather gray than blue. Looking sideways, the flame had a banded red and blue appearance for a short space just above the steel plates. Yet this could not be traced far up beyond the poles with any distinctness, for the colours soon became intermingled and lost in the general stronger colour of the predominant pole, so that at the negative pole the red flame which issued from the magnetically reversed layers was lost at a little distance on the predominant blue, and *vice versa*. Only the red and blue

streaks and sparks ascending in them, of which I shall soon (§ 454) have to speak, retained their colours.

397. The phenomenon here described also includes in itself that which is described in § 9, and illustrated by Fig. 9, but which was less circumstantially related by Miss Reichel than in this case by Josephine Zinkel. The latter also saw, from the side, the flame-like streaks ascending from each separate layer; but she found the interspaces between them not empty, but also filled with odic flame, only of paler luminosity. Miss Reichel's observations were made in an improvised much less perfectly darkened chamber than those of Josephine Zinkel; I subsequently had a perfectly dark chamber prepared. The former, therefore, saw only the more luminous streaks, and the less luminous interspaces appeared to her void; the latter found the entire space above the poles of the nine-layered magnet flaming, with brighter flames from the edges of the layers, which were prolonged upwards, clearly distinguishable through the bundle of flame. The banded appearance of the magnet-flame at the side was thereby still more increased.

398. The *intensity of light* of the odic flame varies extremely, and runs from a weakness in which it appears as but a vapour, even to the highly sensitive, to a bright, and finally to so brilliant a flame, that it was often wholly incomprehensible to them why I could not also see it. At the same time, it never attained to such an intensity that I was enabled to perceive the slightest trace of it, which certainly could not have been from want of attention in my frequent and long-enduring sojourns in the dark. When the flame was gently blown upon, especially in the direction of its flow, the intensity of the light increased, in particular at the places which were acted on. This was witnessed by Josephine Zinkel, Wilhelmine Glaser, Miss Sophie Pauer, Prof. Endlicher, M. Hochstetter, M. Dehlez, and Baroness von Augustin, on

bars, horse-shoes, and electro-magnets of various forms. More will be said of this below at § 409.

399. The *agitation and constant motion* which prevail in the odic flames of the magnet were confirmed in many new experiments by Miss Atzmannsdorfer, Josephine Zinkel, Madame Kienesberger, Weigand, Dorfer, Friedrich Weidlich, the healthy M. Nikolas Rabe, Baron Oberländer, Miss Sophie Pauer, Madame von Peichich, Baroness von Natorp, Madame von Varady, Madame von Tessedik, Prof. Endlicher, M. Delhez, Baroness von Augustin, Dr. Nied, Johann Kynast, Klaiber, and others. The first and last compared it in some degree to the positive brush from the points of an electrical machine, only they described it as much more delicate, fuller, the northward flame bluer, but in like manner mobile and flickering, cool, weakly luminous, sometimes almost of a beaded appearance. It partook of every little agitation of the air in which it was.

400. I often made the *direction* which the flame took the object of investigation with the sensitives. In place of a number of their statements, I will confine myself to two examples, which include in themselves all the rest. I placed a 9-layer horse-shoe upon a stool before Miss Atzmannsdorfer, with the poles turned toward the south. She saw the odic flame flow out of this to about an arm's length, in the dark. It first shot out some distance horizontally in the direction of the limb of the magnet, then rose in a curve upwards and formed a quadrant, so that it at length flowed vertically upwards at its point. The same observation was made by Josephine Zinkel on flames of horse-shoes and bars. Thus, the odic flame is sent out from the poles of the magnet with a certain force, an impetus is communicated to it, which drives it forth from the poles; but, on the other hand, a tendency is implanted in it to ascend in the air, and its material basis is consequently evidently lighter than atmospheric air at the earth's surface. From

the composition of these two forces there results the ascending quadrant curve of the odic flame. This experiment, however, is only to be accomplished with very strong magnets, the flames of which have considerable length; otherwise, in short flames, all observers see the polar flames only in the straight direction, forming a prolongation of the limb of the magnet. From the multiplicity of directions toward the various points of the compass which may be given to the magnet, and the various inclinations toward the horizon into which it may be brought, result complex enlargements and diminutions of the odic flame, according as these directions are conformable or unconformable to the normal position.

401. I here note a series of experiments with several sensitives, for the purpose of investigating the reciprocal effect which different magnetic odic flames could exert upon each other when brought in contact. This might afford further conclusions respecting the relations of magnetism to the odic flame. We regard positive and negative magnetism as endowed with an active tendency to attract each other, and then by a mutual confluence to neutralize one another. But when we consider the curved ascent mentioned in the last paragraph, and place in the scale the phenomena of the odic flame related in § 392, where it occurred unconformably to the inclination, it seems that no such reciprocal attraction dwells in the odic flames; we meet with distinctions between the two in their special manifestations. To the valetudinarian Miss von Weigelsberg, Miss Winter, and Madame Johanne Anschütz; also to her healthy relatives, Miss Ernestine and M. Gustav. Anschütz, M. Delhez, Madame Josephine Fenzl, Madame von Peichich, M. Hochstetter, Dr. Nied, and the Baroness von Augustin, I exhibited two magnetic bars in the darkened chamber, each four inches long, holding them in the magnetic parallel horizontally, with the unlike poles held toward each

other, at the distance of twice the length of the bars apart. At the same time I observed the indispensable precaution of holding the bars in such a manner that my right hand enclosed a southward pole, while the north pole belonging to it projected out ; on the other side a northward pole was enclosed in my left hand, while the south pole belonging to it was outward, the reason of which will shortly be evident. All these witnesses saw the originally small odic flames of both bars become more slender, and increase in length, as soon as the bars were brought near together in the above direction, as if they were striving to reach one another. When I brought the bars really nearer together, the flames went back to their original shorter thicker size, which increased still more and more the nearer I approximated the poles. The intensity of the light increased at the same time. When I joined the magnetically attracting poles, both flames in great part disappeared, but they immediately became stronger on the opposite poles, and now attained double the size that they had before. Dr. Nied and M. Hochstetter added, that the thickness of the odic flames much exceeded that of the steel when the poles came near, and that their brightness was greatest when the ends of the bars were closest together. Miss Reichel saw these phenomena better and more distinctly. In 1844, I placed two little magnetic bars, of almost equal length, in her hands, led her into the dark, and made her hold the unlike poles of both bars in a straight line, bringing them from a distance nearer together. Even at the distance of three times their length, she saw the flames between the poles pointing to one another, acquire a greater size than those of the two outer poles turned away ; they became narrower, longer, thinner, and stretched out toward each other, as if trying to reach one another. On her then bringing the magnets nearer together, these inner flames increased in size at the expense of the outer, and just in

proportion to the approximation. *But when, by the increasing approximation, the flames at length met, they did not neutralize one another ;* they increased in thickness while they lost length by the approach of the poles emitting them. At the opposite external poles they shrank up to a very weak and dull flame. Finally, when the friendly poles became joined, the middle flame was almost entirely extinguished, but at the outer pole of each bar there immediately arose an odic flame far larger than had existed on either of the separate bars : the two bars were now converted into a single one twice as large, and this emitted flames twice as long from both poles. Thus the odic flame increased in equal measure with the growing strength of the magnetism, both in the approaching poles, and, after their union, in those turned away. Prof. Endlicher saw the flames of both bars, when held at some distance apart, increase rather in length, but on approximation to within two-fifths of an inch contract into a disk around their poles ; then, on actual contact of the poles, disappear. M. Pauer observed the same experiment. He saw the two polar flames when I had brought the poles within two inches of each other. They increased in size up to the contact of the poles. Then the light sank considerably in intensity,—not, however, disappearing entirely ; but the two touching steel poles now appeared enclosed in vaporous haloes of light, each about four-fifths of an inch long. Madame von Varady observed the same. Wilhelmine Glaser perceived the same phenomena, and added to the account, that she saw the thickening and mutual repression of the polar flames increase so much just before the actual contact of the two magnet poles, that she perceived a partial introversion of the magnetic flames. This description of the process was made still more complete by the experiments which I made in this direction, in 1845, on Misses Sophia Pauer and Atzmannsdorfer, and in 1846 with Madame Kienesberger and Friedrick Weigand.

In each case I used the same small magnetic bars, and carried out the experiments in the darkened chamber, the beholder sitting with the back to the north, holding the bars horizontally in the magnetic parallel. The phenomena presented themselves all in the same order, and of the same kind as above given; first, at a distance, elongation and attenuation of the approximated odic flames, as though they were exerting an active endeavour to reach one another. But this meeting did not come to pass when the flames came near enough, for a return to the original shape now occurred: with the increasing approximation, this thickness became greater and greater at the cost of the continually diminishing length, and when the flames should actually have met, they were so far from exhibiting any desire to join, that they exerted mutual repulsion, drove one another back, and became continually shorter and more repressed. They behaved as if seized with a mutual fear, became accumulated around their own poles, like the flame of a candle blown upon gently from above; and when, at the distance of only a few lines apart, each flame formed a kind of broad flattened coil around its pole, distinctly repulsed by the odic flame standing opposite to, and pressing upon it. This repression went so far that, when only $\frac{2}{5}$ ths of an inch interspace existed between the poles of the two bars, both flames appeared *thrown backwards* upon their own poles, and, to a certain extent, introverted around it. This took place in particular sooner with the flames of the corners than with the flames of the middle of the ends of the poles, which were compressed into a sort of disk around the poles, at length applied one upon the other. When the poles came at length into contact, and became attached, this state of things continued for two or three seconds, decreasing in such a manner that the curved flames appeared to become gradually shorter until they were extinguished. But this extinction was not actual, being only a decrease

of intensity of the light of the odic flames : careful observers, M. Pauer, like his daughter Sophie, and Madame Kienesberger, detected its persistence in a weaker condition, enveloping the joined magnet poles. In the meanwhile the flames of the two opposite ends of the bars became so much the stronger, and doubled their size.

402. I used magnetic bars twice the length with Madame Cecilie Bauer. She saw the positive red pole and the negative blue pole flaming beautifully, the former two, the latter four inches long. As I brought the friendly poles of the rods nearer together, with the hands properly selected, in the parallel, the flames stretched out toward each other, became thickened and expanded as I approached them nearer, then were introverted in some degree around their poles, and, when I had completed the union, the introversion vanished, and was succeeded by envelopment of the poles lying against each other in the opposed odic flames.

403. When, however, the *similar, thus hostile poles, were approximated in the same way in the dark*, especially the two negative, the original elongation and attenuation did not occur ; but, where the poles came near together, the flames, if the magnets were strong, were drawn back, and finally introverted around their own poles in the same way as with the unlike poles. But if they were of unequal strength, the stronger flame of the larger magnet drove back the weaker one of the smaller sooner, heaped it up against its pole, when it expanded in the form of a disk or little wheel, the plane of which was at right angles to the axis of the magnet. One of the beholders, Miss Atzmannsdorfer, compared this phenomenon also, among other things, with the experiment of blowing down upon the flame of a candle, so as to drive it down upon its wick, where it is also compelled to expand sideways by the current of air opposing the draught of the flame.

404. These experiments were carried through the most varied modifications with the healthy Madame Cæcilie Bauer and Josephine Zinkel, and the results are shown most clearly here. In the first experiments with the latter, when her power of vision was not particularly strong, she did not perceive any distinct flame on the little magnetic bars in the dark, but only a luminous mist or smoke. But these went through the same course as the others had seen the flames do; elongation of the smoke at a distance, with apparent endeavour to reach and blend with one another, non-effectuation of this when sufficiently close but expansive in thickness, then repression and division through introversion around their own poles; finally, on contact of the poles of the magnets, a slow disappearance of the luminous smoke and a doubling of it at the opposite free poles. In another experiment I made use of the epoch of her menstruation, when she saw incomparably better in the dark, and I applied two small magnetic bars, one of which was rather larger and stronger than the other. The arrangement was the same as in the preceding cases. I extract the passages relating to this from my journal: "Zinkel, experiment No. 453.—*a.* The two southward poles approximated, the flame of the smaller bar disappeared almost entirely from her perception; that on the larger became weaker, and what remained was introverted around its pole. *b.* The two northward poles approximated, both became introverted. *c.* Friendly poles approximated, the northward pole of the larger bar being brought to the southward pole of the smaller; the flame of the smaller southward pole was extinguished, that of the larger northward pole weakened and introverted. *d.* The same, only the northward pole of the smaller bar approximated to the southward pole of the larger; both flames extinguished on contact of the poles. Thus the stronger pole always overcame the weaker, and the remnant of odic flame became introverted. But the

southward pole is always weaker in proportion than the northward." In these experiments the weakly luminous envelope, or flame remaining, escaped observation.

404. b. In some later experiments with her the phenomena were more distinct; and in one the results accorded exactly with Madame Bauer. With bars eight inches long—

a. Similar poles first mutually repelled the odic flames, but on contact of the steel both were totally extinguished.

b. Unlike poles at first attracted each other at a distance, their flames becoming elongated, but on approximation they were contracted, thickened, and at length so much so that the introversion on both sides followed.

c. When the contact of the poles of the magnets was completed the introversion disappeared, and the odic flames of the two opposite poles became perfectly immersed in each other.

d. This immersion was much deeper than the introversion, indeed five or six times as deep. An introversion of 1-25th of an inch in depth was followed, on contact of the steel, by an immersion, in which the blue was one-fifth of an inch long, the red shorter, but more than half the length.

e. The intensity of light of the luminous envelope producing the immersion was so strong that the odic incandescence of the bars could not be seen through it; the observers saw nothing of the steel bars at the part where they were encircled by the envelope of flame, and first perceived their ends again when they were drawn out of it: this surrounded them as a dense luminous cloud, involving the bar to such an extent as to render it invisible.

f. So long as I made the experiments in the parallels, the girl Zinkel perceived the introversion of the red flame only; that of the blue she was uncertain of. But when I brought the bars into the meridian, conformably, the intensity of the light was exalted, and the blue flame also now became visible.

g. Approximation of the poles of smaller magnetic bars, of four inches length but of greater magnetic intensity, brought together in the parallels with unlike poles, gave proportionately greater enlargement in space of the blue polar flame than of the red: on the other hand, the red polar flame acquired greater intensity of light than the blue. Thus the light did not increase to any great extent in the one, nor did the size in the other.

405. I also traced this subject with *horse-shoe magnets* on various sensitives. M. Hochstetter observed, in the darkened chamber, the gradual approximation of a three and a five-layered horse-shoe. At some distance he perceived the elongated; when they came near, the abbreviated, repulsed, thickened flames, much thicker than the limb itself of the magnet; when the poles were joined, the flames vanished from his sight, which had only a moderate degree of sensibility to odic light. With Miss Sophie Pauer all these observations were repeated with greater clearness and more circumstantiality; she saw the odic flames introverted around the poles, become converted, on the union of these, into an envelope of the intermingled flames of the adjoining poles. I went most carefully to work with Josephine Zinkel. I laid two five-layer magnets upon a table, in the meridian, the four unlike poles directed toward each other. I will here give a full account of the whole process, in all its parts, for the sake of summing up the results.

a. At a distance of two feet between the poles the beholder saw the northward poles of both magnets in a blue, the southward in a red light; those lying conformably clearer than the unconformable, and the limbs odically incandescent as well as flaming; the blue negative emitted horizontal streams almost eight inches long over the table; the red positive about six inches long. *b.* The flames of the two magnets did not meet at first; in the interspace between them she saw a luminous smoke rising up to a

height of about two inches, and then vanishing. *c.* A light was diffused some distance round upon the table, some twelve or sixteen inches on every side, and the luminosity rose upwards above the table, so that the poles of the horse-shoe appeared to be surrounded with a glory. *d.* The limbs were wholly covered with luminous flame as far as the curvatures, reddish upon the southward limbs, bluish on the northward. *e.* When the poles were moved far enough apart, the unilluminated interspace appeared gray in the dark; but when the smoke of the two horse-shoes met, a transverse bright streak, produced by this, became visible upon the table. *f.* When I moved both horse-shoes to a distance of sixteen inches, the lights of the two streams of flame met upon the surface of the table; the now united smokes ascended a hand's breadth and a span high. *g.* Brought to twelve inches distance, the opposite flames met, acted upon each other, and began to grow thicker. *h.* Approximated to eight inches, the flames came more strongly together, rose up more from the table, on account of becoming thicker, to a height of about two inches and a half, and luminous smoke ascended six inches high over them. *i.* On approximation to four inches, the odic flames grew thicker and rose continually higher above the table, especially that of the northward pole; the smoke went on increasing in height. *k.* At an approximation of two inches, the phenomenon of introversion of the odic flames around their own poles presented itself, and in such a manner that it was repulsed and introverted about two inches on the north side. The smoke now *no longer ascended in front of the poles, but behind them*, directed upward towards the curvature. *l.* When brought to a distance of four-fifths of an inch, the introversion became so great that the inverted flame of each pole passed back over the limb from which it issued beyond the curvature, to a distance of not less than full four inches. The smoke now rose from both horse-

shoes far behind the curvatures, and indeed did not begin to ascend at a less distance than four inches from it. *m.* Finally, on actual contact of all four magnet-poles all these introversions suddenly vanished, and a complete immersion of the opposite polar flames succeeded : the mixed flame presented itself. This extended almost to the opposite curvatures, and so veiled the limbs that they could only be seen with difficulty. The blue limbs, which just before were in blue introverted flames, were now suddenly deserted by them, and enveloped in red mixed flames, while the red limbs became enclosed in blue mixed flame : thus all four changed their colours in a moment. The curvatures of the horse-shoes at the same time seemed to become more brightly incandescent, and the beholder again compared them to a white translucent jelly. The smoke had then disappeared, and was nowhere to be seen in profile.

I shall return to several of these particular phenomena (which have been touched upon, in part, under the head of odic incandescence), where they necessarily come into their own sections : they are not separated from each other here, as I wished to give a general view of this experiment.

406. When the united poles of the magnets were separated again, the somewhat strange observation was made, that the mixed flames did not disappear immediately. As I parted the horse-shoes again in the last experiment, the beholder saw the mixed flames still persist, and not vanish until they were removed nearly an inch away from each other. Then the smoke began to rise again, and the curvatures became dimmer. A similar experiment, with unlike horse-shoe magnets—a three-layered, and a five layered—gave the same results with Josephine Zinkel ; the mixed flames persisted when I had drawn the two poles about one-twenty-fifth of an inch apart. This was repeated, even with bar magnets, which lay in the meridian. Both were about two feet long, and one inch square in substance. When both

lay with their unlike poles joined in the meridian, Josephine Zinkel could not detect the mixed flames in the dark, probably on account of too little strength of the magnets, and too weak intensity of odic light for her power of vision at that time. As soon, however, as I had separated the two bars only to the distance of the thickness of paper, the mixed flames immediately became visible ; the northward pole of the one enveloped the southward pole of the other blue, and *vice versa*, and to a length of about four inches.

407. All this shows with much probability that the odic flame is a true ejection of some kind of substance, which becomes odically accumulated immediately upon the outer surface of the magnet thus brought into a luminous condition, and then thrown out. When it meets with obstacles, it becomes diverted or repelled. An opposite stream meeting it may be an obstacle of this kind ; but when the poles of the two magnets are joined, the obstacle is removed, and the mixed flames result. The mixed flame is the action of the residuum of the magnetism and Od arrested in their course at the poles, which, on account of insufficient contact of the steel substance, cannot become conducted away quickly and perfectly enough. The path once opened, the current may persist for some time, from one to another, even in the opposite direction, in its channel. The nearer the opposite poles remain to each other, the more easily will the current be maintained, and be carried on from one to the other ; we have already perceived on many occasions that they have no continuity. And the better the ends of the poles fit, the more numerous and intimate are the points of contact of the two poles, so much the more perfectly does the magnetism appear to be conducted, and to be confined within its own circuit ; so much the weaker then are the phenomena of odic light ; the introverted and intermingled flames then approach to invisibility. We shall hereafter

have to examine similar phenomena in the odic light of crystals, and shall there arrive at further deductions.

408. When flames of magnetic bars, no matter whether positive or negative, pass over each crosswise, quite close, nay, so as actually to touch, without, however, running directly against each other, *neither attraction nor repulsion* is exhibited by them. We have seen the like in the preceding experiments with the flames over horse-shoe magnets ; they flowed side by side from negative and positive poles, in parallel direction, without attracting, still less lifting up, each other. But when the two flames did actually come into opposition, both Miss Reichel and Miss Atzmannsdorfer observed that the *stronger flame always carried away the weaker with it*, yet only when the stream possessed superior force. However, according to a variety of indications from the statements of both observers, that odic flame always possesses the strongest propulsion which lies nearest to its source, that is, the emitting pole of the magnetic bar, and this always carries away with it the other, which, at the point of crossing, is further removed from its source. In these circumstances it makes no difference which of the flames is the larger : under the given conditions the flame of a small magnet carries away that of a larger, and rules its course.

409. *The motion* which is communicated to the *odic flame by blowing upon it* has already been touched upon (Part I. § 20). Since that time I have endeavoured to establish it more certainly by repeated experiments with a great number of persons. Miss Sturmann, in the very earliest experiments, remarked that draughts moved the flame backwards and forwards. Miss Reichel amused herself during her sick nights, with making the flames flicker, by waving her hand and giving them all kinds of forms, by blowing upon them. Miss Winter made the flames flare backward and forward by blowing on them ; and so also did Dr. Nied. M. Hochstetter blew them apart, strengthened, drove

them about, and split them up. Miss Sophie Pauer scattered them among each other by blowing on them, and saw them more luminous as long as she continued to blow. In the presence of Friedrich Weidlich, I blew upon a horse-shoe magnet in the dark, at a part where I had reason to expect the existence of odic flames ; he told me directly that they had become interrupted and scattered, but recovered themselves immediately. The healthy joiner Klaiber often moved the magnetic flame in my presence by blowing on it. Professor Endlicher saw the lights, which flowed to a length of four inches from the poles of a five-layer horse-shoe, become brighter by being blown upon ; when he blew along the horse-shoe,—that is, in the direction of the current of flame,—they both became brighter and longer ; at the same time, however, flickering unsteadily. M. Delhez breathed upon the flames of the nine-layered horse-shoe, and saw them become brighter and flare about. Madame Joscphine Fenzl blew into the flame of an electro-magnet, and saw the flame curl round. Stephan Kollar produced splitting up and flickering of the electro-magnetic current of flame by blowing into it. Wilhelmine Glaser breathed upon a bar lying conformably parallel with its direction ; she saw the flame enlarge, and grow brighter. Another time she did this with a nine-layered magnet, and scattered, enlarged, and whirled about the flame. Josephine Zinkel blew down upon the flame of the nine-layer horse-shoe, and made it pass off to all sides ; directly she ceascd, the flames gathered up and arranged themselves again. When she blew gently along a bar, conformably, she saw the flame become brighter and larger, and spread out like a jet of a gas-light, to which she closely compared it. The Baroness von Augustin blew down along the limb of a five-layer horse-shoe. She then not only saw the odic flame become considerably brighter, and flare, but remarked, that, when she did it in sudden puffs, a little piece of odic flame was detached every time from the

pole, and flew on a little distance, independently, before it became extinguished; just as, in a common fire, little portions of flame separate, and sweep upwards in the air alone for a moment. Miss Atzmannsdorfer likewise observed, when she blew in puffs, that little pieces of flame were sometimes detached from their connection with the steel, and swept on a moment free in the air. Thus the observation is confirmed in all quarters, that the *odic flame may be affected, and set in mechanical motion, by the breath, and the movement of the air.*

410. This is the proper place to explain more clearly an observation which was related in Part I. § 13. It is there stated, on the information of Miss Reichel, that the flame of the common magnet was diverted by that of an electro-magnet. This was actually the case; yet not in a stationary condition of the apparatus, but during the rotation of the electro-magnet, which I neglected to note expressly in that place. By the rapid rotation is produced an active draught of air; and it was this which blew aside, and drove outwards, the horse-shoe, as in the cases just described. The fact remains the same; the interpretation of it, however, requires more accurate definition here.*

* On this, as on every occasion, the accuracy of Miss Reichel's statements is seen, even proving to be right when I at first imagined them to be incorrect. And this is that same Leopoldine Reichel, whom her countrymen, the Vienna physicians, have not been ashamed to describe publicly as a liar and deceiver. This Leopoldine is a plain but sensible and correct girl, belonging to a religious order, who, during the three months she resided in my house, behaved in the most blameless manner, and so indeed as to acquire the good will of every one. There is no easier way of covering one's ignorance, than briefly to dispose of every abstruse phenomenon, which, from want of knowledge, cannot be understood, and from want of skill in research cannot be made out, with the presumptuous explanation that it is a deception; but there is also nothing more unmanly and dishonourable—I must say it straight out—than to misuse one's power in lightly and ignorantly robbing a poor, sick, and defenceless girl of her only possession, her good name, and to

411. If we now collect the observations from § 399 to this point, we obtain, in a variety of ways, confirmation of the frequently-expressed hypothesis that the odic flame in itself is not magnetism. It does not follow its laws of

brand her with the mark of shame. When this accusation is an untruth, a flat calumny, as I will prove to these gentlemen by evidence from their own account of their lamentable set of investigations, it is most atrocious, and every honest heart, feeling for truth and duty, will join in my indignation against such unworthiness. I will give them one of these proofs at once here. It is said to be a lie, that Miss Reichel saw magnetic light anywhere. This at once stamped my accounts on this head with untruth, since they rested at first in great part on the observations of this sensitive person. I now invite these scientific gentlemen of the self-styled committee of Vienna physicians, to visit M. Pauer and his daughter, two persons whose good faith no one in Vienna will venture to question, and to ask them what they saw in the dark, when I placed a dozen different magnets before them? If this does not suffice, I further invite them to ask Baron August. von Oberländer, M. Nikolous Rabe, M. Gustav Anschütz, M. Sebastian Zinkel, whether they saw flames over magnets, or not? I desire them to visit Baroness von Tessedik, Madame Cäcilie Bauer, Madame Johanna Anschütz, Baroness von Natorp, Madame Kienesberger, Miss Winter, the Baroness von Augustin, and to hear what they saw blazing upon magnets in the dark? Then they may be so good as to inquire of Prof. Endlicher, Messrs. Kotschy, Tirka, von Rainer, Fernolendt, Kollar, Schuh, and Hochstetter, whether or not they saw luminous phenomena upon magnets? I beg them to compare with this what they can obtain on the same subject from the mouths of Madame Jos. Fenzl, Misses von Weigelsberg, Dorfer, Glaser, Weigand, Zinkel, Kynast, the joiner Klaiber, Bollman, &c. &c., well known persons living in Vienna, daily to be met and spoken with. And if all this prove insufficient, I finally direct them to one of their own colleagues in Vienna, Dr. Nied, the physician, of whom they may inquire about the phenomena which were presented to him in my darkened chamber; also of the Stockholm court-physician, Dr. Huss. May they obtain the truth they require! If these honourable persons do not all unanimously say that they have seen extraordinary luminous phenomena, partly luminous vapour, partly coloured flames of considerable size over magnets in the dark, then will I own that Miss Reichel never saw light, that she is a liar and deceiver, and that I have really been fooled by her, and thus the true though veiled purpose of these physicians will be attained. But

attraction and repulsion, and is of so material a nature that it may be driven backward and forward like a common flame by movements of the air. It rather manifests the character of an *associated phenomenon of magnetism*, which scarcely follows its current even partially ; it resembles a projectile of it, which, when thrown off, continues its own course in the direction of the impulse which it originally receives, and of obstacles and new impulses it meets in its way.

412. It appeared to me interesting to *apply* the observations gathered on the subject of the odic incandescence and odic flame, *to the common rubbing of steel magnets*. All the lights here described must in this necessarily come to view, and be confirmed in various ways ; and there seemed hope of deriving new information respecting the processes of producing steel magnets, and of the transfer in general of magnetism and Od from one body to another. For this purpose the following operations were performed with Josephine Zinkel.

413. I commenced with *bar-magnets*, and then proceeded to *horse-shoes*.

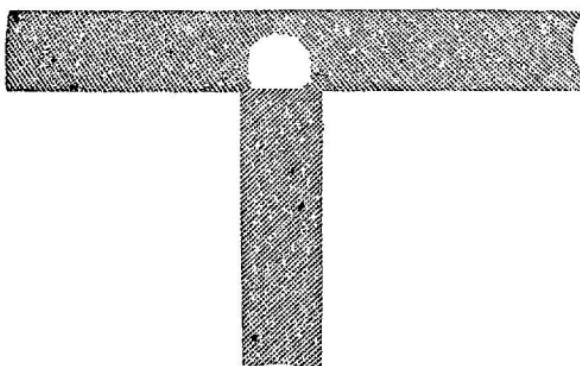
The first manifestation of light which was afforded to the

if the reverse happens, and the testimony of all these persons incontestably establishes the fact of the magnetic light, then I beg these gentlemen not to be angry with me if I say before all the world that they are either miserable experimenters, incapable of performing the simplest physical research with even the appearance of accuracy, or that they must suffer the contempt, which is the reward of unprincipled conduct, to fall away from Leopoldine Reichenel, and descend upon themselves. Nature is eternal. After thousand millions of years will the odic light flow and shine as it does to-day. But the endeavours to overcome such a truth, when it has once happily been found and disclosed, are paltry and poor.—*Author's Note.*

Some of the most eminent of the London practitioners of physic and surgery have great need for lessons like the above to be read to them. Charlatanism in professions, like cowardice in rank and file, shelters its dishonour in the fellow-feeling of numbers.

beholder was, that always when I placed the rubbing magnet perpendicularly upon the rubbed, the latter became far more highly incandescent at the part touched. The polar extremity of the rubber thus acted with its whole magnetic and odic force, so strongly upon the rubbed steel bar, that it made it much more luminous where it was in contact with it. Fig. 16 may render this more clear. This luminous phenomenon occurred in every case, whether the contact was made upon the poles, the axis, or any other part of the rubbed magnet. And since it was also extinguished directly the rubber

FIG. 16.



was taken away or carried along, it was consequently found that as the rubber was drawn along from one pole to the other of the rubbed magnet, in the usual pass, the bright patch also moved from pole to pole of the rubbed bar, always accompanying the pole of the rubber as it passed over the rubbed one. And since the rubbed bar, especially when it lay in the meridian, as we have seen above, § 338, has blue odic incandescence on its northward half, and red on its southward, the wandering patch of incandescence also appears with bluish light on the former and reddish on the latter half. With regard, therefore, to the action which a rubbing magnet exerts on a rubbed one in respect to *odic incandescence*, this presents itself to the eye as a *local action*, which is connected with the immediate presence of the rubbing pole, and is not diffused over the whole extent of the rubbed bar, at least not visibly. Here there appears to be a difference between odic and pure magnetic action, as

the latter is diffused over the whole of the rubbed bar in every pass, and so not only appears over its totality, but remains attached to it.

In these experiments I used two bars, of which the rubbed one was eighteen inches; the rubber, rather larger and stouter, twenty-four inches long. Let us now examine the process of rubbing, first upon the rubbed bar, then on the rubber; and in the first place with regard to the odic incandescence, and afterwards to the odic flame.

414. A.—*Odic incandescence of the rubbed bar.* I laid a steel bar, which was only weakly magnetic, upon a table, in the meridian. It possessed weak odic incandescence in the dark, so that its northward half seemed to have merely gray instead of blue light, its southward half only whitish-yellow instead of yellowish red, both opaque and dull.

I laid the rubber, westward of the former, in the parallel, upon the same table, and moved the northward poles of both towards each other, in such a manner that the two magnets enclosed a right angle between them. Then I began to do exactly as one does when wishing to rub one bar with the other, only with the distinction that I brought both bars into the horizontal position, while it is usual to bring them together in a vertical plane, which might not be exactly the same thing in the essentials of the matter.

The behaviour was as follows :

a. First, on contact of the two negative poles, the northward pole of the rubbed bar appeared blue odically incandescent over half its length toward the south; the southern, somewhat shorter half, red incandescent.

b. When the rubber had been moved a quarter of the length along the rubbed bar, the same condition appeared, but now almost three-fifths of its northern part were blue, and only two-fifths remained red at the south.

c. When the rubber reached the middle, the blue incandescence had grown to three-fourths of the rubbed bar; in