him the charge of voluptuous living, though the most temperate and abstemious Athenian of his day; that thus, with yet keener malevolence, endeavoured to brand him with the still fouler reproach of the grossest impiety and atheism. It is, indeed, scarcely to be believed, if the fact were not concurrently attested by all the writers of antiquity, that the philosopher whose name, from the low and malignant spirit I have just adverted to, has been proverbialised for general licentiousness and excess, drew the whole of his daily diet from the plainest pottage, intermixed with the herbs and fruits of his pleasant and celebrated garden. "I am perfectly contented," says he, in an epistle to another friend, "with bread and water alone; but send me a piece of your Cyprian cheese, that I may indulge myself whenever I feel disposed for a luxurious treat." Such, too, was the diet of his disciples. Water, says Diocles, was their common beverage; and of wine they never allowed themselves more than a very small cup. And hence, when the city of Athens was besieged by Demetrius, and its inhabitants reduced to the utmost extremity, the scholars of Epicurus bore up under the calamity with less inconvenience than any other class of citizens; the philosopher supporting them at his own expense, and sharing with them daily a small ration of his beans. The pleasure of friendship, the pleasure of virtue, the pleasure of tranquillity, the pleasure of science, the pleasure of gardening, the pleasure of studying the works of nature, and of admiring her in all the picturesque beauty of her evolutions, formed the sole pursuit of his life. This alone, he affirmed, deserves the name of PLEASURE, and can alone raise the mind above the grovelling and misnamed pleasures of self-indulgence, debauchery, and excess.

There is something gratifying to an enlarged and liberal spirit in being thus able to rescue from popular, but unfounded obloquy, a sage of transcendant genius and almost unrivalled intellect, and in restoring him to the admiration of the virtuous and the excellent. That he did not feel the force of any argument offered by nature in proof of the immortality of the soul, and was in this respect considerably below the standard of Socrates and Cicero, must be equally admitted and lamented; and should teach us the high value of that full and satisfactory light which was then so much wanted and has since been so gloriously shed upon this momentous subject. But let it at the same time be remembered, that, with a far bolder front than either of the philosophers here adverted to, he dared to expose the grossness and the absurdities of the popular religion of his day, and in his life and his doctrines gave a perpetual rebuke to vice and immorality of every kind. And hence, indeed, the main ground of the popular calumny with which his character was attacked, and which has too generally accompanied his memory to the present day.

LECTURE IV.

ON THE PROPERTIES OF MATTER, ESSENTIAL AND PECULIAR.

In our last lecture I endeavoured to render it probable, that all visible or sensible matter is the result of a combination of various solid, impenetrable, and exquisitely fine particles or units of the same substance, too minute to be detected by any operation of the senses. Of the shape or magnitude of these particles we know nothing: and even their solidity and impenetrability, as I then observed, is rather an assumption for the purpose of avoiding several striking difficulties and absurdities that follow from a denial of these qualities, than an ascertained and established fact.

From this unsatisfactory view of it in its elementary and impalpable state, let us now proceed to contemplate it in its manifest and combined forms, and to investigate the more obvious properties they offer, and the general laws by which they are regulated.

The change of distance between one material body and another, or, in other words, their approach to or separation from each other, is called MOTION; and the wide expanse in which motion of any kind is performed, is denominated SPACE.

Matter has its ESSENTIAL, and its PECULIAR PROPERTIES. Its essential properties are those which are common to it under every form or mode of combination. Its peculiar properties are those which only appertain to it under definite forms or definite circumstances.

The ESSENTIAL PROPERTIES of matter are usually classed under the six following heads: passivity, extension, density, impenetrability, divisibility, and gravitation; which, however, may easily be reduced to four, since extension, density, and impenetrability, may be comprehended under the general term cohesibility.

PASSIVITY, *inertia* or *vis inertiæ*, is the tendency in a body to persevere in a given state, whether of rest or motion, till disturbed by a body of superior force. And hence these terms, which are mere synonymes, imply a power of mobility as well as a power of quiescence; although passivity has often been confined to quiescence, while mobility has been made a distinct property. Thus it is from the same power, or tendency to passivity, that a cannon ball continues its motion after being projected from a gun, as that by which it remained at rest before it was thrown off; for it is a well known theorem in projectiles, that the action of the powder on a bullet ceases as soon as the bullet is out of the piece. In like manner a billiard ball at rest will continue so till put into motion by a billiard ball in motion, for it can never commence motion of its own accord. While a billiard ball in motion would persevere in motion, and in the same velocity of motion, for ever, if it met with no resistance. But it does meet with resistance from a variety of causes, as the friction of the atmosphere, the friction of the green cloth, and at last a contact with one of the sides of the table, or with the ball against which it is directed.

In this last case either ball will receive conversely the same precise proportion of rest or motion which it communicates. Thus, if the ball in motion strike the ball at rest obliquely, the latter will be put into a certain degree of activity, and the former will, in the very same degree, be impeded in its progress, and receive an equal tendency to a state of rest. If the latter, on the contrary, by what is significantly called a *dead* stroke, receive the whole charge of motion which belongs to the former, it will give to the former, in like manner, the whole possession of its quiescence, and the state of each will be completely reversed: the ball hitherto at rest proceeding with all the velocity of that hitherto in motion, and the ball hitherto in motion exhibiting the dead stand of that hitherto at rest.

So, if it were possible to place an orb quietly in some particular part of space, where it would be equally free from the attractive influence of every one of the celestial systems, it would, from the same tendency to inertitude, remain quiescent and at rest for ever. While, on the contrary, if a body were to be thrown from any one of the planets by the projectile force of a volcano, or of any other agency, beyond the range of the attractive or centripetal power of such planet, it would continue the same velocity of motion for ever which it possessed at the moment of quitting the extreme limit of the planet's influence; unless in its progress it should encounter the influence of some other planet; and in this last case it would be either drawn directly into contact with the planet it thus casually approached, or would have its path inflected into a circle, and revolve around it as a satellite, according to its velocity, and the relative direction of its course at the moment the planetary influence began to take effect. Thus a body projected horizontally to the distance of about 4.35 miles from the earth's surface, provided there were no resistance in the atmosphere, would not fall back again, but become a satellite to the earth, and perpetually revolve around it at this distance. The moon is supposed to have no atmosphere, or, at the utmost, one rarer than we can produce with our best air-pumps: she is also supposed to possess larger and more active volcanoes than any which are known to exist on the earth. And hence it requires no great stretch of imagination to conceive that bodies

may occasionally be thrown from the moon, by the projectile power of such volcanoes, to such a distance as that they should never return to her surface: for if the momentum be only sufficient to cause the mass ejected to proceed at the rate of about 8,200 feet in the first second of time,* and in a line passing through the moon and the earth, such effect would necessarily be produced; since, in this case, the propelled mass would quit the centripetal power of the former, and be drawn into that of the latter, and would either become a satellite to the earth, or be precipitated to its surface, according as the rectilinear force of the projectile was equal or inferior to the attractive force of the earth at their first meeting together.

Yet this is, perhaps, but little more than the velocity with which a twenty-four pound cannon ball would travel from the moon's surface: since its velocity on the earth's surface may be calculated at about 2,000 feet for the first second; and it would rush nearly four times as rapidly if not impeded by the resistance of the atmosphere. And hence it is to this cause that M. Olbers first, and M. la Place has since, ascribed the origin of those wonderful aerolites, or stones, that are now known to have fallen from the air at some period or other in every quarter of the globe; believing them to be in every instance volcanic productions of the moon, thrown by the impulse of the explosion beyond the range of her centripetal influence.

Cohesibility is the tendency which one part of matter evinces to unite with another part of matter so as to form out of different bodies one common mass. It includes the three modes which have often been regarded as three distinct properties, of *extension*, *density*, and *impenetrability*. Extension is a term as applicable to space as to matter: "The extension of body," observes Mr. Locke, "being nothing but the cohesion or continuity of solid, separable, moveable parts; and the extension of space the continuity of unsolid, inseparable, and immoveable parts." Hence extension applies to all directions of matter, for its continuity may take place in all directions; but in common language the longest extension of a body is called its length, the next its breadth, and the shortest its thickness.

Density is a property in matter to cohere with a closer degree of approximation between the different particles of which it consists; so that the same body, when in the exercise of this property, occupies a smaller portion of space than before it was called into act. Hence density cannot be a property of space, the parts of which, as I have just observed, are immoveable, and cannot, therefore, either approach or recede.

Impenetrability is the result of density, as density is of extension. It is that property in matter which prevents two bodies from occupying the same place at the same time. They are all branches of the common property of cohesibility. A wedge of iron, indeed, may force its way through the solid fibres of the trunk of a tree; but it can only do this by separating them from each other: it cannot penetrate the matter of which those fibres consist. In like manner, when a ship is launched, her hulk cannot sink into the water without displacing the exact bulk of water which existed in the space that the hulk below the surface now occupies.

To a cursory survey, however, there are some phenomena that seem to show that certain bodies are penetrable by others. Thus, if a cubic inch of water be mixed with a cubic inch of spirit of wine or sulphuric acid, the bulk of the compound will be something less than two cubic inches. But in this case one of the fluids appears to admit a part of the other fluid into its pores; a fact of which there can be but little doubt, since, if no evaporation be allowed to take place, though the bulk of the mixture is somewhat diminished, its weight is precisely equal to what it ought to be. The combination of different metals affords, not unfreqently, similar instances of equal introsusception.

Divisibility is a power in matter directly opposed to its cohesibility. It is that property of a body by which it is capacified for separating into parts, the union or continuity of which constituted its extension.

* La Place, Exposition du Système du Monde.

Divisibility, however, does not destroy cohesion in every instance equally; though the farther it proceeds, the farther it loosens it. We are told by Mr. Boyle, that two grains and a half of silk were, on one occasion, spun into a thread not less than three hundred yards long, which is, notwithstanding, a much shorter length than the spider is capable of spinning his web of the same weight. Muschenbroek mentions an artist of Nuremburg, who drew gold wire so fine that 500 inches of it only weighed one grain; and Dr. Wollaston has obtained platinum wire as fine as $\frac{1}{30000}$th of an inch.* The thickness of tin-foil is about a thousandth part of an inch;† that of gold-leaf is less than a two hundredth thousandth part of an inch; and the gilding of lace is still thinner, probably in some cases not more than a millionth part of an inch; and there are living beings visible to the microscope, of which a million million would not make up the bulk of a common grain of sand. Yet it is highly probable, from what has actually been ascertained of the anatomy of minute and miscroscopic animals, that many of these are as complicated in their structure as the elephant or the whale.

Gravitation is the common basis upon which all the preceding properties are built, except passivity; the great principle into which all the rest resolve themselves. Gravitation is the attraction by which bodies of all kinds act upon each other, with a force regulated by the aggregate proportion of their respective quantities of matter, and decreasing as the squares of the distances increase. It is a law impressed on matter universally, and hence operates alike on the minutest and on the largest masses; produces what we call weight on earth, or the tendency of heavy bodies to fall towards the earth's centre; and governs the revolutions of the planets. The five principles which regulate its mode of action, and constitute its magnificent code of laws, are thus summed up by M. la Place.‡

1. Gravitation takes place between the most minute particles of bodies.
2. It is proportional to their masses.
3. It is inversely as the squares of the distances.
4. It is transmitted instantaneously from one body to another.
5. It acts equally on bodies in a state of rest, and upon those which, moving within its range, seem to be flying off from its power.

To a casual observer there are many substances that seem to fly away from the earth, and consequently to oppose this general law. Thus smoke, when extricated from burning bodies, and vapour, when separated from liquids, ascend into the atmosphere; and a piece of cork, plunged to the bottom of a vessel of water, rises rapidly to the surface. But, in all these phenomena, the bodies that seem to move upwards merely give way to bodies of a heavier kind, or, in other words, which have a stronger tendency towards the earth. Thus smoke and vapour only ascend, because the surrounding air, which is heavier than these, presses downwards and takes their place; and the cork rises because lighter than the water into which it has been plunged: but empty the vessel, and the cork will remain at the bottom, because heavier than the surrounding air; and let the smoke or the vapour be received into a vacuum, and it will remain as much at the bottom as the cork.

It was first systematically demonstrated by Sir Isaac Newton, that all the motions of all the heavenly bodies depend upon the same power; and the principle thus struck out has of later years been still more extensively and even more accurately applied to a solution of the most complicated phenomena. This principle in astronomy is denominated the centripetal force, and the term is sufficiently precise for all common purposes; since, although speaking with perfect strictness, the central point of no solid substance is the actual spot in which its attractive power is chiefly lodged, yet it has been abundantly proved by Sir Isaac, that all the matter of a spherical body, or a spherical surface, may, in generally estimating its attractive force on other matter, be considered as collected in the centre of such sphere. And hence, as all the celestial bodies are nearly spherical, their action on bodies at a dis-

* Wollaston in Phil. Trans. for 1813, p. 114. Thomson's Annals of Philos. No. III. p. 224.
† Davy's Elem. vol. i. p. 379. ‡ Exposition du Système du Monde.

tance may be held the same as if the whole of the matter of which they consist were condensed into their respective centres.

To what extent in the heavens the power of gravitation ranges it is impossible to determine; there can be little doubt, however, that it extends from one fixed star to another, although its effects are too inconsiderable to be calculated by man. It may possibly influence the progressive motion of several of the stars, and, as I had occasion to observe in a preceding lecture, is the cause to which Dr. Herschel ascribes the origin of the material universe, which he supposed at one time, though he seems afterward to have modified his opinion, as we shall notice in our next study, to have issued from an immense central mass of matter, peculiarly volcanic in its structure, and to have been, consequently, thrown forth in different quantities, and at different times, by enormous explosions; each distinct mass, thus forcibly propelled, assuming, from the common law of projectiles, an orbicular path, and endowed with the common property of the parent body, ejecting in like manner, minuter masses at different periods of time, which have equally assumed the same orbicular motion, and ultimately become planets to the body from which they have immediately issued, and which constitutes their central sun.

To produce such an effect, however, and in reality to produce any of the motions which occur to us in the celestial bodies, the PASSIVITY of matter is just as necessary as its gravitation. I have already observed that, owing to its passivity, or VIS INERTIÆ, matter has a tendency to persevere in any given state, whether of motion or of rest, till opposed by some exterior power; and that the path it assumes must necessarily be that of a right line, unless the power it encounters shall bend it into a different direction. A projectile, therefore, as a planet, for example, thrown forth from a volcano, would travel in a right line for ever, and with the exact velocity with which it was thrown forth at first, if there were nothing to impede its progress; or to alter the course at first given to it. But the attraction of the volcanic sphere from which it has been launched does impede it, and equally so from every point of its surface: the consequence of which must necessarily be, that every step it advances over the parent orb it must be equally drawn back or reined in, and hence its rectilinear path must be converted into a curve or parabola, and a tendency be given to it to escape in this line, which may be contemplated as a line of perpetual angles, instead of in a direct course; and as soon as the projectile or planet has acquired the exact point in which the two antagonist powers precisely balance each other—the power of flying off from the centre, communicated to it by the volcanic impulsion, and which is denominated its CENTRIFUGAL FORCE, and the power of falling forwards to the centre, communicated by the attractive influence of the aggregate mass of matter, which the parent sphere contains in itself, and which is called its CENTRIPETAL FORCE—it will have reached its proper orbit; and, through the influence of this constant antagonism of the two properties of passivity and gravitation, of a centrifugal and centripetal force, persevere in the same to the end of time.

Of the immediate cause of gravitation, or the nature of that power which impels different bodies to a union, we are in a very considerable degree of ignorance; or rather, perhaps, may be said to know nothing at all. It is necessary, however, to notice one very singular phenomenon concerning it, and to give a glance at two out of various theories by which gravitation has been attempted to be accounted for.

The phenomenon is, that although owing to this power, all bodies have a tendency to come into contact, they never come into actual contact: some kind of pore or open space being still left between the corpuscles of bodies that approach the nearest to each other. Thus, a plate of heated iron, solid as it appears to be, and altogether destitute of pores, becomes contracted in every direction by cold. So, too, as I have already observed, equal measures of water and alcohol, or of water and sulphuric acid, have their bulk sensibly diminished. In like manner, Newton has remarked, that when two plates of

glass are within about a ten thousandth part of an inch of each other, using fine metallic plates as a micrometer on this occasion, they support each other's weight as powerfully as if they were in actual contact, and that some additional force is requisite in order to make them approach still nearer. Nor is the force necessary to produce this effect of trivial moment: Professor Robison has calculated it, and has ascertained by experiment that it is equal to a pressure of a thousand pounds for every square inch of glass. Air is not necessary to this resistance, for it is equally manifest in a vacuum; yet it is a very curious fact, that under water it almost entirely disappears. It is, however, highly probable that the contact is never perfect, otherwise the two plates might be expected to cohere in such a manner as to become an individual mass.

It is hence clear that matter, from some cause or other, is possessed of a REPULSIVE as well as of an ATTRACTIVE force; and that, like the latter, although its law has not been hitherto exactly ascertained, it increases in a regular proportion to its decrease of distance, or, in other words, as bodies approximate each other.

It has hence been said, and this is the common theory of those who regard gravitation as an essential property of matter, that matter is universally endowed with two opposite powers; by the one of which material substances attract each other, and induce a perfect union; and by the other of which they repel each other when they are on the point of union, and prevent a perfect contact. It is admitted, however, on all hands, and is indeed perfectly clear in itself, that the repulsive power is of an almost infinitely less range than the attractive. I have supposed the attractive power, or that of gravitation, to operate from world to world; yet the repulsive power can never be exerted, except "between such particles as are actually, or very nearly, in contact with each other; since it requires no greater pressure, when acting on a given surface, to retain a gallon of air in the space of half a gallon, than to retain a pint in the space of half a pint, which could not possibly be, if the particles exercised a mutual repulsion at all possible distances."*

This idea, however, of double and opposite powers co-existing in the same substance, and in every corpuscle of the same substance, has been uniformly felt difficult of admission by the best and gravest philosophers; and hence Sir Isaac Newton, while allowing the repulsive power of matter, which in truth is far more obvious to our senses in consequence of its very limited range, has felt a strong propensity to question gravity as forming an essential property of matter itself, and to account for it from another source. "To show," says he, "that I do not take gravity for an essential property of bodies, I have added one question concerning its cause, choosing to propose it by way of question, because I am not yet satisfied about it, for want of experiments."† In this question he suggests the existence of an ethereal and elastic medium pervading all space; and supports his supposition by strong arguments, and consequently with much apparent confidence, deduced from the mediums, or gases, as they are now called, of light and heat, and magnetism, respecting all which, from their extreme subtlety, we can only reason concerning their properties. This elastic medium he conceives to be much rarer within the dense bodies of the sun, the stars, the planets, and the comets, than in the more empty celestial spaces between them, and to grow more and more dense as it recedes from the celestial bodies to still greater distances: by which means all of them, in his opinion, are forced towards each other by the excess of an elastic pressure.

It is possible, undoubtedly, to account for the effects of gravitation by an ethereal medium thus constituted; provided, as it is also necessary to suppose, that the corpuscles of such a medium are repelled by bodies of common matter with a force decreasing, like other repulsive forces, simply as the distances increase. Its density, under these circumstances, would be every where such as to produce the semblance of an attraction, varying like the attraction of gravitation. The hypothesis in connexion with the existence

* Dr. Young's Lect. vol. i. p. 612. † Optics, pref. to the second edition.

of a repulsive force in common matter has a great advantage in point of simplicity, and may perhaps hereafter be capable of proof, though at present it can only be regarded, and was at first only offered, as an hypothesis.

M. la Place, equally dissatisfied as Sir Isaac Newton with the idea of gravitation being an essential property of matter, passes away from the inquiry with suitable modesty, to practical subjects of far higher importance, and which equally grow out of it, in whatever light it is contemplated. "Is this principle," says he, "a primordial law of nature? or is it a general effect of an unknown cause? Here we are arrested by our ignorance of the nature of the essential properties of matter, and deprived of all hope of answering the question in a satisfactory manner. Instead, then, of forming hypotheses on the subject, let us content ourselves with examining more particularly the manner in which philosophers have made use of this most extraordinary power."*

There is, indeed, one very striking objection to Sir Isaac Newton's suggestion, and which it seems very difficult to repel. It is, that though it may account for the attraction of gravitation, as a phenomenon common to matter in general, it by no means accounts for a variety of particular attractions which are found to take place between particular bodies, or bodies particularly circumstanced; and which, excepting in one or two instances, ought, perhaps, to be contemplated as modifications of gravitation.

Upon these particular attractions, or modes of attraction, including homogeneous attraction, or the attraction of aggregation, heterogeneous attraction, or the attraction of capillary bodies, elective attraction, and those of magnetism and electricity, each of which is replete with phenomena of a most interesting and curious nature, I intended to have touched in the present lecture, but our limited hour is so nearly expired, that we must postpone the consideration of them as a study for our next meeting. Yet it is not possible to close the observations which have now been submitted, without testifying our gratitude to the memory of that transcendent genius whom the providence of the adorable Architect of the universe at length gave to mankind six thousand years after its creation, to unravel its regular confusion, and reduce the apparent intricacy of its laws to that sublime and comprehensive simplicity which is the peerless proof of its divine original.

It has been said, that the discovery of the universal law which binds the pebble to the earth, and the planets to the sun, which connects stars with stars, and operates through infinity, was the result of accident. Nothing can be more untrue, or derogatory to the great discoverer himself. The earliest studies of Newton were the harbinger of his future fame: his mighty mind, that comprehended every thing, was alive to every thing; the little and the great were equally the subjects of his restless researches: and his attention to the fall of the apple was a mere link in the boundless chain of thought, with which he had already been long labouring to measure the phenomena of the universe.

Grounded, beyond all his contemporaries, in the sure principles of mathematics, it was at the age of twenty-two that he first applied the sterling treasure he had collected to a solution of the system of the world. The descent of heavy bodies, which he perceived nearly the same on the summit of the loftiest mountains and on the lowest surface of the earth, suggested to him the idea that gravity might possibly extend to the moon; and that, combined with some projectile motion, it might be the cause of the moon's elliptic orbit round the earth: a suggestion in which he was instantly confirmed by observing that all bodies in their fall describe curves of some modification or other. And he further conceived, that if the moon were retained in her orbit by her gravity towards the earth, the planets must also in all probability be retained in their several orbits by their gravity towards the sun.

To verify this sublime conjecture, it was necessary to ascertain two new and elaborate positions: to determine the law of the progressive diminution

* Exposition du Système du Monde, liv. iv. ch. xv.

of gravity, and to develope the cause of the curves or ellipses of falling bodies. Both these desiderata he accomplished by a series of reasonings and calculations equally ingenious in their origin and demonstrative in their result; and ascertained the truth of his principles by applying them, practically and alternately, to the phenomena of the heavens, and to a variety of terrestrial bodies.

The bold and beautiful theorem being at length arrived at, and unequivocally established—a theorem equally applicable to the minutest corpuscles, and the hugest aggregations of matter—that all the particles of matter attract each other directly as their mass, and inversely as the square of their distance, he at once beheld the cause of those perturbations of motion to which the heavenly bodies are necessarily and so perpetually subject: it became manifest, that the planets and comets, reciprocally acting and acted upon, must deviate a little from the laws of that perfect ellipse which they would precisely follow if they had only to obey the action of the sun: it was manifest, that the satellites of the different planets, exposed to the complicated action of the sun, and of each other, must evince a similar disturbance: that the corpuscles which composed the different heavenly bodies in their formation, perpetually pressing towards one common centre, must necessarily have produced, in every instance, a spherical mass: that their rotatory motion must at the same time have rendered this spherical figure in some degree imperfect, and have flattened these masses at their poles; and, finally, that the particles of immense beds of water, as the ocean, easily separable as they are from each other, and unequally operated upon by the sun and the moon, must evince such oscillations as the ebbing and flowing of the tides. The origin, progress, and perfection of these splendid conjectures, verifications, and established principles, were communicated in two distinct books, known to every one under the titles of his "Principia" and his "Optics;"—books which, though not actually inspired, fall but little short of inspiration, and have more contributed to exalt the intellect of man, and to display the perfections of the Diety, than any thing upon which inspiration has not placed its direct and awful stamp.

LECTURE V.

ON THE PROPERTIES OF MATTER, ESSENTIAL AND PECULIAR.

(The subject continued.)

We closed our last lecture with remarks on the universal operation of the common principle of gravity over matter in all its visible forms, from the minutest shapes developed by the microscope, to the mightiest suns and constellations in the heavens. But we observed, also, that, independently of this universal and essential power of attraction, matter possesses a variety of peculiar attractions dependent upon circumstances of limited influence, and which consequently render such attractions themselves of local extent.

These I will now proceed to notice to you in the following order:—1st, The attraction of *homogeneous* bodies towards each other, which is denominated, in chemical technology, the attraction of aggregation: 2dly, The attraction of *heterogeneous* bodies towards each other, under particular circumstances, which in its more obvious cases is denominated capillary attraction: 3dly, The attraction of bodies exhibiting a peculiar degree of affinity to each other, and which is denominated electrive attraction: 4thly, The attraction of the electric fluid; and, 5thly, That of the magnetic.

I. The law of physics, which has rendered every material substance capable of attracting and being attracted by every other material substance, seems at the same time to have produced this power in a much stronger degree between SUBSTANCES OF LIKE NATURES. Thus, drops of water placed upon a plate of dry glass have a tendency to unite, not only when they touch, but when in a state of vicinity to each other; and globules of quicksilver still