



XXXVI. An account of the speculations of Thomas Wright of Durham

Prof. De Morgan

To cite this article: Prof. De Morgan (1848) XXXVI. An account of the speculations of Thomas Wright of Durham , Philosophical Magazine Series 3, 32:215, 241-252, DOI: [10.1080/14786444808645975](https://doi.org/10.1080/14786444808645975)

To link to this article: <http://dx.doi.org/10.1080/14786444808645975>



Published online: 30 Apr 2009.



Submit your article to this journal [↗](#)



Article views: 4



View related articles [↗](#)

THE
LONDON, EDINBURGH AND DUBLIN
PHILOSOPHICAL MAGAZINE
AND
JOURNAL OF SCIENCE.

[THIRD SERIES.]

APRIL 1848.

XXXVI. *An Account of the Speculations of Thomas Wright of Durham.* By Prof. DE MORGAN*.

M. ARAGO, in his account of William Herschel, published in the Paris *Annuaire* for 1842, recalled the attention of astronomers to the fact that some speculative researches into the constitution of the stellar universe had preceded those of his illustrious subject. He instances Wright, Kant and Lambert, from the second of whom he draws all his information as to the first. Professor Struve, in his recently published *Etudes d'Astronomie Stellaire*, St. Petersburg, 1847, 8vo, again mentions Wright from Kant, and gives the titles of his works from Lalande. But neither Kant, Arago, nor Struve, had seen the work of Wright in question. I propose to give an account of it, as of a speculation which must take a high rank among those daring and yet sober attempts at prediction of future results, which are, and ought to be, repaid upon success for the contempt with which they are always received on appearance. The author did not, as speculators sometimes do, attempt to discount his fame, and to procure an endorsement of good names for a bill of long date upon posterity. He published his work in a quiet way, and left time to show what it was worth.

The work † in question is entitled *Theory of the Universe*,

* Communicated by the Author.

† 'An Original Theory or New Hypothesis of the Universe, Founded upon the Laws of Nature, and solving by Mathematical Principles the General Phænomena of the Visible Creation; and particularly the Via Lactea. Compris'd in Nine Familiar Letters from the Author to his Friend. And Illustrated with upwards of Thirty Graven and Mezzotinto Plates, By the Best Masters. By Thomas Wright, of Durham.

*One Sun by Day, by Night ten Thousand shine,
And light us deep into the DEITY.*—Dr. YOUNG.

London: Printed for the Author, and sold by H. Chapelle, in *Grosvenor Street*. MDCCL. Quarto, pp. xii. + 84, plates 32.

Phil. Mag. S. 3. Vol. 32. No. 215. April 1848. R

and was published in 1750. Kant, as appears by Professor Struve's statement, took his knowledge of it from the *Hamburgische Freie Urtheile* of 1751, and wrote on the same subject in his *Allgemeine Naturgeschichte und Theorie des Himmels*, Leipzig, 1755, 8vo. As far as I can see from Professor Struve's description of Kant's views, there is not in them any extension of Wright's, except in two points, which I shall notice in the proper place.

Wright's work consists of nine letters to a friend, and in its speculations is both astronomical and theological; the latter term including not merely expression of devotional feeling, but much actual conjecture on what astronomy may teach in relation to the future state of mankind. Omitting this, I shall proceed to register the purely astronomical doctrines of the treatise, so far as they seem peculiar to Wright.

I make one long extract from the seventh letter, which might have been shortened, and the English of it made more clear and more correct, with no loss to Wright's memory. But as this passage is very important as evidence, and is unquestionably, out of the whole book, that which most nearly contains the pith and marrow of the system, I have thought it best to extract the whole of it.

In the preface it is stated that the chief design is "an Attempt towards solving the Phænomena of the *Via Lactea*, and in consequence of that Solution, the framing of a regular and rational Theory of the known Universe, before unattempted by any." It is "... entirely upon a new Plan, and the Beginning, as it were, of a new Science, before unattempted in any Language, the Author having dug all his Ideas from the Mines of Nature. . . ." And further, "How the Author has succeeded in this Point, is a Question of no great Consequence; he has certainly done his best; another, no Doubt, will do better, and a third perhaps, by some more rational Hypothesis, may perfect this Theory, and reduce the Whole to infallible Demonstration: . . ."

The claim which Wright makes to originality will easily be admitted; and his priority must remain uncontested until it can be impugned upon evidence. At present, neither Arago nor Struve have met with anything of the same kind anterior to Wright.

In the first letter Wright gives the opinions of preceding authors. He states that his own system was first planned in 1734. I need not describe his very imperfect enumeration of his predecessors. In 1732, *Robert Wright*, whom I ought to mention to prevent his being confounded with the subject of this notice, published his Newtonian lunar tables for the navy.

The second letter is on probability and certainty, and, though ingenious and sound, has nothing to the present purpose. It concludes with an account of celestial systems anterior to that of Copernicus.

The third letter is on the planetary motions and structures. It contains nothing peculiar to Wright, except a declaration that he is strongly of opinion that the orbits of comets have all their areas equal. This is not a happy conjecture. He draws the notion from observing that the comets of 1680 and 1682, the most and least excentric of those whose orbits had been calculated, have areas not very unequal, and such as a supposition of moderate errors of observation might make equal. The following sentence is of a better kind, be the latter part worth what it may. "... the Clouds are to us in effect no other than as so many Moons, whereby we have our artificial Day prolonged to us several Hours after the Sun is set, and likewise produced as much sooner before he rises; and were they to ascend by still stronger Power of Exhalation to an Elevation, all round the Atmosphere, so as to form a Sphere equal to four Times the Globe of the Earth, there would then be no such Thing as real nocturnal Darkness to any Part of the World."

The fourth letter continues his remarks on the nature of the heavenly bodies. That the sun is a vast body of blazing matter, he thinks will hardly admit of question: though he afterwards supposes it possible that the igneous matter may be only an envelope. Aberration is spoken of with caution. "Mr. Bradley, Astronomer-Royal, has, in a great measure, proved that the Aberration of the Stars hitherto mistaken for a Parallax, may arise from, and indeed seems to be no other than the progressive Motion of Light, and Change of Place to the Eye, arising from the Earth's annual Motion and Direction." His friend is recommended to procure an idea of the appearance of the sun to more distant planets than our own, by means of concave glasses fitted to reduce the apparent diameter duly. The homogeneity of the stars with our sun, both as to constitution and attendant bodies, is strongly insisted on from analogy.

The fifth letter first mentions the milky way, which he says "... still continues to be unaccounted for, and even in an Age vain enough to boast Astronomy in its utmost Perfection. What will you say, if I tell you, it is my belief we are so far from the real Summit of the Science, that we scarce yet know the Rudiments of what may be expected from it? This luminous Circle has often engrossed my Thoughts, and of late has taken up all my idle Hours; and I am now in great Hopes I

have not only at last found out the real Cause of it, but also by the same Hypothesis, which solves this Appearance, shall be able to demonstrate a much more rational Theory of the Creation than hitherto has been any where advanced, and at the same Time give you an entire new Idea of the Universe, or infinite System of Things." The milky way is then described, and the opinions of the ancients upon it. A plate is given of a portion near the foot of Antinous, as observed by Wright himself with what he calls a very good reflector: the plan was formed "by a Combination of Triangles." He afterwards mentions his observing with a "one Foot reflecting Telescope." Proceeding on the opinion of Democritus and others among the ancients, and on his own partial resolution of the galactic light, he pronounces the phænomenon to arise from a congeries of small stars. He does not seem to be acquainted with the partial resolution made by Galileo: and in general, his reading in astronomy anterior to his own day seems to lie rather in classical or mediæval authors, or their translators and compilers, than in those of the seventeenth century.

Making the assumption that the stars shine by their own light, he proceeds thus: "Here it will not be amiss to observe, that it has been conjectured, and is strongly suspected, that a proper Number of Rays, meeting from different Directions, become Flame; and that hence it may prove not the Sun's real Body which we daily see, but only his inflamed Atmosphere. I begin to be of Opinion, and I think not without Reason, that the true Magnitude of the Sun is not near what the modern Astronomers have made it; and that it may not possibly be much above two Thirds of what it appears to us; This, tho' I presume to call it at present only meer Hypothesis, will in a great measure account for the excessive Changes in the Constitution of our Air and Atmosphere, which we often find very unnatural to the Season; But all this will very naturally be accounted for by the Levity, or expanding Quality of the Sun's circumambient Flame, or Atmosphere; and hence, according to its various State, being more condensed, or rare, we may have Heat or Cold in the greatest Extream, and alternately so, in a perpetual Vicissitude."

Wright then proceeds to estimate the number of stars in the milky way, and to discuss the question of the distance of stars from our sun. Making the distance of one star from another at least about three thousand times that of the furthest planet from our sun, he argues that ". . . . as no sensible Disorder can be observed amongst the solar Planets, what Reason have we to suppose any can be occasioned amongst the Stars, or that a general Motion of these primary Luminaries round

a common Center, should be any way irrational, or unnatural?"

The sixth letter is headed 'Of General Motion amongst the Stars, the Plurality of Systems, and Innumerability of Worlds.' That the stars are not promiscuously dispersed, he argues from the phænomenon of the milky way, supposed to be resolvable into stars. He then proceeds to say, "If any regular Order of the Stars then can be demonstrated that will naturally prove this Phænomenon to be no other than a certain Effect arising from the Observer's Situation, I think you must of course grant such a Solution at least rational, if not the Truth; and this is what I propose by my new Theory." Afterwards he adds, "... we may reasonably expect, that the *Via Lactea*, which is a manifest Circle amongst the Stars, conspicuous to every Eye, will prove at last the Whole [creation] to be together a vast and glorious regular Production of Beings, ... and that all its Irregularities are only such as naturally arise from our excentric View: To demonstrate which absolutely and incontestibly, we shall only want this one *Postulata* to be granted, viz. that all the Stars are, or may be in Motion." From thence, presuming the stars to have each its attendant system, and arguing that the motion of each primary itself is no more extraordinary than the motion about its axis (which the sun has), he proceeds to discuss the evidence, as it then existed, for apparent proper motion, and considers such a phænomenon established by various instances, and particularly by Arcturus, from comparison with old observations, after allowance for the varying obliquity of the ecliptic. He then recommends close observation of the distances between each two stars in a cluster, for detection of the proper motions, and ends this letter with an engraving of the Pleiades, laid down from his own observations.

The seventh letter gives the explanation of the phænomenon of the milky way, as now generally received. The following are the first words in which this explanation was ever offered, as it turns out. "But of this I have said enough, and think it is now more than Time to attempt the remaining Part of my Theory.

"When we reflect upon the various Aspects, and perpetual Changes of the Planets, both with regard to their* heliocentric and geocentric Motion, we may readily imagine, that nothing but a like excentric Position of the Stars could any way produce such an apparently promiscuous Difference in

* "Not to mention their several Conjunctions and Apulces to fixed Stars, &c. see the State of the Heavens in 1662, December the first, when all the known Planets were in one Sign of the Zodiac, viz. *Sagittarius*."

such otherwise regular Bodies. And that in like manner, as the Planets would, if viewed from the Sun, there may be one Place in the Universe to which their Order and primary Motions must appear most regular and most beautiful. Such a Point, I may presume, is not unnatural to be supposed, although hitherto we have not been able to produce any absolute Proof of it. See *Plate XXV.* This is the great Order of Nature, which I shall now endeavour to prove, and thereby solve the *Phænomena of the Via Lactea*; and in order thereto, I want nothing to be granted but what may easily be allowed, namely, that the *Milky Way* is formed of an infinite Number of small Stars.

“Let us imagine a vast infinite Gulph, or Medium, every Way extended like a Plane, and inclosed between two Surfaces, nearly even on both Sides, but of such a Depth or Thickness as to occupy a Space equal to the double Radius, or Diameter of the visible Creation, that is to take in one of the smallest Stars each Way, from the middle Station, perpendicular to the Plane’s Direction, and, as near as possible, according to our Idea of their true Distance.

“But to bring this Image a little lower, and as near as possible level to every Capacity, I mean such as cannot conceive this kind of continued Zodiac, let us suppose the whole Frame of Nature in the Form of an artificial Horizon of a Globe, I don’t mean to affirm that it really is so in Fact, but only state the Question thus, to help your Imagination to conceive more aptly what I would explain. *Plate XXIII.* will then represent a just Section of it. Now in this Space let us imagine all the Stars scattered promiscuously, but at such an adjusted Distance from one another, as to fill up the whole Medium with a kind of regular Irregularity of Objects. And next let us consider what the Consequence would be to an Eye situated near the Center Point, or any where about the middle Plane, as at the point A. Is it not, think you, very evident, that the Stars would there appear promiscuously dispersed on each Side, and more and more inclining to Disorder, as the Ob-

	B		F
D	A	H	
E	C		G

server would advance his Station towards either Surface, and nearer to B or C, but in the Direction of the general Plane towards H or D, by the continual Approximation of the visual Rays, crowding together as at H, betwixt the Limits D and

G, they must infallibly terminate in the utmost Confusion? If your Opticks fails you before you arrive at these external Regions, only imagine how infinitely greater the Number of Stars would be in those remote Parts, arising thus from their continual crowding behind one another, as all other objects do towards the Horizon Point of their Perspective, which ends but with Infinity: Thus, all their Rays at last so near uniting, must meeting in the Eye appear, as almost, in Contact, and form a perfect Zone of Light; this I take to be the real Case, and the true Nature of our *Milky Way*, and all the Irregularity we observe in it at the Earth, I judge to be intirely owing to our Sun's Position in this great Firmament, and may easily be solved by his Excentricity, and the Diversity of Motion that may naturally be conceived amongst the stars themselves, which may here and there, in different Parts of the Heavens, occasion a cloudy Knot of Stars, as perhaps at E.

“But now to apply this Hypothesis to our present Purpose, and reconcile it to our Ideas of a circular Creation, and the known Laws of orbicular Motion, so as to make the Beauty and Harmony of the Whole consistent with the visible Order of its Parts, our Reason must now have recourse to the Analogy of Things. It being once agreed, that the Stars are in Motion, which, as I have endeavoured in my last Letter to shew is not far from an undeniable Truth, we must next consider in what Manner they move. First then, to suppose them to move in right Lines, you know is contrary to all the Laws and Principles we at present know of; and since there are but two Ways that they can possibly move in any natural Order, that is either in right Lines, or in Curves, this being one, it must of course be the other, *i. e.* in an Orbit; and consequently, were we able to view them from their middle Position, as from the Eye seated in the Center of *Plate XXV.* we might expect to find them separately moving in all manner of Directions round a general Center, such as is there represented. It only now remains to show how a Number of Stars, so disposed in a circular Manner round any given Center, may solve the Phænomena before us. There are but two Ways possible to be proposed by which it can be done, and one of which I think is highly probable; but which of the two will meet your Approbation, I shall not venture to determine, only here inclosed I intend to send you both. The first is in the Manner I have above described, *i. e.* all moving the same Way, and not much deviating from the same Plane, as the Planets in their heliocentric Motion do round the solar Body. In this Case the primary, secondary, and tertiary constituent Orbits, &c. framing the Hypotheses, are represented in *Plate XXII*, and

the Consequence of such a Theory arising from such a universal Law of Motion in *Plate XXIII.* where B, D denotes the local Motion of the Sun in the true *Orbis Magnus*, and E, C that of the Earth in her proper secondary Orbit, which of course is supposed, as is shown in the Figure to change its sidereal Positions, in the same Manner as the Moon does round the Earth, and consequently will occasion a kind of Procession, or annual Variation in the Place of the Sun, not unlike that of the Equinoxes, or Motion of all the Stars together, from West to East round the Ecliptic Poles, and probably may in some Degree be the Occasion of it. This Angle is represented, but much magnified, by the lines F, C, G, and the Unnaturalness, or Absurdity of a right Line Motion of the Sun by the Line I, H.

“The second Method of solving this Phænomena, is by a spherical Order of the Stars, all moving with different Direction round one common Center, as the Planets and Comets together do round the Sun, but in a kind of Shell, or concave Orb. The former is easily conceived, from what has been already said, and the latter is as easy to be understood, if you have any Idea of the Segment of a Globe, which the adjacent Figures, will, I hope, assist you to. The Doctrine of these Motions will perhaps be made very obvious to you, by inspecting the following Plates. *Plate XXIV.* Is a Representation of the Convexity, if I may call it so, of the intire Creation, as a universal Coalition of all the Stars consphered round one general Center, and as all governed by one and the same Law. *Plate XXV.* Is a central Section of the same, with the Eye of Providence seated in the Center, as in the virtual Agent of Creation. *Plate XXVI.* Represents a Creation of a double Construction, where a superior Order of Bodies C, may be imagined to be circumscribed by the former one A, as possessing a more eminent Seat, and nearer the supream Presence, and consequently of a more perfect Nature. Lastly, *Plate XXVII.* Represents such a Section, and Segments of the same, as I hope will give you a perfect Idea of what I mean by such a Theory. *Fig. 1.* is a corresponding Section of the Part at A, in *Fig. 2.* whose versed Sine is equal to half the Thickness of the starry Vortice AC, or BA. Now I say, by supposing the Thickness of this Shell, 1. you may imagine the middle Semi-Chord AD, or AE, to be nearly 6; and consequently, thus in a like regular Distribution of the Stars, there must of course be at least three Times as many to be seen in this Direction of the Sine, or Semi-chord AE, itself, than in that of the semi-versed Sine AC, or where near the Direction of the Radius of the space G. Q.E.D.

“But we are not confined by this Theory to this Form only, there may be various Systems of Stars, as well as Planets, and differing probably as much in their Order and Distribution as the Zones of *Jupiter* do from the Rings of *Saturn*, it is not at all necessary, that every collective Body of Stars should move in the same Direction, or after the same Model of Motion, but may as reasonably be supposed as much to vary, as we find our Planets and Comets do.

“Hence we may imagine some Creations of Stars may move in the Direction of perfect Spheres, all variously inclined, direct and retrograde; others again, as the primary Planets do, in a general Zone or Zodiac; or more properly in the manner of *Saturn's* Rings, nay, perhaps Ring within Ring, to a third or fourth Order, as shown in *Plate XXVIII.* nothing being more evident, than that if all the Stars we see moved in one vast Ring, like those of *Saturn*, round any central Body, or Point, the general Phænomena of our Stars would be solved by it; see *Plate XXIX. Fig. 1.* and *2.* the one representing a full Plane of these Motions, the other a Profile of them, and a visible Creation at B and C, the central Body A, being supposed as *incognitum*, without the finite View; not only the Phænomena of the *Milky Way* may be thus accounted for, but also all the cloudy Spots, and irregular Distribution of them; and I cannot help being of Opinion, that could we view *Saturn* thro' a Telescope capable of it, we should find his Rings no other than an infinite Number of lesser Planets, inferior to those we call his Satellites: What inclines me to believe it, is this, this Ring, or Collection of small Bodies, appears to be sometimes very excentric, that is, more distant from *Saturn's* Body on one Side than on the other, and as visibly leaving a larger Space between the Body and the Ring; which would hardly be the Case, if the Ring, or Rings, were connected, or solid, since we have good Reason to suppose, it would be equally attracted on all Sides by the Body of *Saturn*, and by that means preserve everywhere an equal Distance from him; but if they are really little Planets, it is clearly demonstrable from our own in like Cases, that there may be frequently more of them on one Side, than on the other, and but very rarely, if ever, an equal Distribution of them all round the *Saturnian* Globe.

“How much a Confirmation of this is to be wished, your own Curiosity may make you judge, and here I leave it for the Opticians to determine. I shall content myself with observing that Nature never leaves us without a sufficient Guide to conduct us through all the necessary Paths of Knowledge; and it is far from absurd to suppose Providence may have every

where throughout the whole Universe, interspersed Modules of every Creation, as our Divines tell us, Man is the Image of God himself.

“Thus, Sir, you have had my full Opinion, without the least Reserve, concerning the visible Creation, considered as Part of the finite Universe; how far I have succeeded in my designed Solution of the *Via Lactea*, upon which the Theory of the Whole is formed, is a Thing will hardly be known in the present Century, as in all probability it may require some Ages of Observation to discover the Truth of it.”

The eighth and ninth letters, which are on the modes of conceiving space and time, and contain general reflections on the whole scheme, contain nothing which need be quoted. Wright seems to have been the first who started the idea of representing the solar system by selected objects on the earth. Representing the sun by the dome of St. Pauls, a sphere of eighteen inches diameter at Marylebone will be the earth, and so on. There is internal evidence that these letters were written in London.

I should sum up by saying that Wright appears to have been a man of great ingenuity, and of moderate learning, of a strong turn for the invention of hypothesis, and great power of appreciating its probability. He had a firm persuasion that astronomical discovery was then very imperfect, both in quantity and quality, a persuasion which regulated even his ordinary expressions. It is not often, in his day, that we find, as in his works, the planets described as the *known planets*, implying an assumption that there might be more. He gave the theory of the milky way which is now considered as established, contended for what is now called the central sun, inclining strongly to the belief of an actual central body, though he sometimes qualifies it by stating the alternative of a central body or a central point. He contends for the probability of different creations of the kind of which the milky way is one; but he does not seem to have known of more than half a dozen nebulae, and he does not push his views so far as to conjecture that these “cloudy spots” are themselves other such creations: he rather refers them to condensations occurring in the mass of stars to which our sun belongs. His prediction of the ultimate resolution of Saturn’s rings into congeries of small satellites remains to be verified; but it is thought by some to be most probable that such is the truth. It is hardly necessary to say that Wright supposes mutual gravitation to be the connecting agent between star and star, as well as between stars and their planets.

Kant adds to what he probably learnt from the review of

Wright, the distinct supposition that the nebulæ are other specimens of constellative systems, and that these systems, with our own, may be but parts of a larger one, and so on. He also declares for Sirius as the central body of our system. Wright considers Sirius merely as our nearest neighbour.

There is an account of Thomas Wright (with a good portrait) in the *Gentleman's Magazine* for 1793, vol. lxiii. pp. 9, 126, 213. He was born at Byer's Green, about six miles from the city of Durham, September 22, 1711, the son of a carpenter, a small landholder. He was apprenticed to a clock-maker, then went to sea, and afterwards struggled for many years as a maker of almanacs, a lecturer, and a teacher of mathematics. During this time he published some works. At last he seems to have risen into note as a teacher of the sciences in noble families; and we find him in affluence towards the end of his life, but how it came is not stated. He built himself a handsome house at Byer's Green in 1756-62, and died there February 25, 1786. By various communications made by him to the *Gentleman's Magazine* from 1744 upwards, it appears that he was an observer, particularly of comets, a calculator of their elements, &c. In his younger days he was employed by Heath and Sisson as a maker of mathematical instruments; and he wrote on navigation and taught it with a reputation which procured him, in 1742, an offer of the professorship of navigation in the Imperial Academy of St Petersburg. He was moreover an engraver, and even executed the plates for some of his own works; and as the one which I have described has so many quarto plates, effectively done in mezzotinto, and without the name of any engraver attached, I conclude, in spite of "by the best masters" in the title-page, they are of Wright's own workmanship. He had some acquired scholarship, but not of a very profound cast.

I learn from Professor Chevallier, of the University of Durham, to whom I am indebted for the references to the *Gentleman's Magazine*, that when the library of Mr. Allan of Darlington, the author of the memoir cited, was sold by auction in London in 1822, it contained, as the memoir states, the original copper of several of Wright's plates. And further, that Wright appears to have been consulted on matters of taste: for that in the chapter library of Durham there is a design by him for some alterations in the Cathedral, including an ornamented battlement with finials upon the western towers; which design was carried into execution, as is to be seen.

The works by Wright which are mentioned in the memoir, are some calculations of eclipses (single leaves, I suppose,

descriptive of the phases, after the manner of the time); the *Pannauticon*, a work on navigation, published in 1734; *Louthiana*, a work on the antiquities of Ireland, of which one volume only was published in 1748; the treatise described in this article; and others which I do not note, as according to a common fashion of biographical memoirs, there is a confusion between works "completed" and works printed and published. Lalande mentions *The Use of the Globes*, London, 1740, 8vo; *Clavis Cœlestis*, being the explication of a diagram entitled *A Synopsis of the Universe* . . . London, 1742, 4to; and the work above described.

It seems to me that Wright is entitled to have his speculations considered, not as the accident of a mind which must give the rein to imagination, and sometimes get into a right path, but as the justifiable research and successful conclusion of thought founded on both knowledge and observation. And I submit that his name ought to be enrolled in the list of discoverers.

University College,
March 7, 1848.

XXXVII. *On the supposed Influence of Magnetism on Chemical Action.* By ROBERT HUNT, Esq.

To Richard Phillips, Esq.

DEAR SIR,

THE question whether magnetism exerts any influence on chemical phænomena, has for a very considerable period agitated the world of science. On the one hand, we find Von Arnim, J. W. Ritter, Ludicke, Maschmann, Hansteen, Schweigger, Döbereiner, Muller, Kastner, Fresnel, Murray, Rendu, Zantedeschi, and Ampère expressing opinions, derived from their observations, that some influence is exerted, in many cases retarding, and in others accelerating chemical action; while one or two of these observers assert that magnetism has even the power of setting up chemical change. On the other hand, Steinhäuser, Erman, Dulk, Wetzlar, Otto-Linné Erdman, Berzelius, Ridolfi, Nobili and Wartmann*, state that they have not been enabled to detect any such influence, although they have employed magnets of great power in their experiments.

It is evident, from this array of names, that the question is surrounded with considerable difficulties; and it becomes

* Third Memoir on Induction by Prof. Elie Wartmann, *Phil. Mag.* for April, 1847, p. 264.