

**THOMAS
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SCIENCE AND
MEDIEVAL
THOUGHT

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*Science and Medieval Thought The Harveian Oration Delivered Before the
Royal College of Physicians, October 18, 1900:*

Содержание

PREFACE	4
INTRODUCTION 1	9
Конец ознакомительного фрагмента.	36

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PREFACE

IN the Middle Ages the old world had passed, and the vision of a new world came near to the eager and passionate hearts of many peoples. Lincoln and Wells, Amiens and Chartres, Florence and Assisi tell us of the glory of that vision; and bear witness of its flight: for with Gilbert, Galileo, Harvey and Newton the Middle Ages themselves became a phantom, and again the spirit of a new world appeared. Thus in the phases of time the world dies and is born again; fulfilling greater destinies. But the new are born in the cold bed of the elder worlds, and the young life is chilled, or a lustier offspring turns unnaturally to curse the dead; so in their decrepitude lay the Middle Ages upon modern life; and

the Middle Ages were accursed, until certain pious men sought to reanimate their vestments and their formulas, and to set the hands back on the dial of the centuries; as many-minded man seeks wistfully to reanimate the simple wonders and beliefs of his childhood. Their ministry was no more than pious; the method of modern history wins the fruits of the past while casting away the shadow of its withered branches. This comparative method, first applied to the art and romance of the Middle Ages, so that every dilettante may now discourse to us of their evolution, has been applied also to the thought of the period; but its results, laid up in the closets of a few scholars, are as yet unfamiliar. It may then become one, who in no sense a scholar has strayed into these secret places, to try to distribute some lessons of the medieval thought which, to many of us, seems as sere and outworn as did the relics of Gothic shrines to our great-grandfathers. For, as in those medieval generations which lay nearest us the furnace had cooled, impatiently we had thrown metal and dross aside, and let our contempt for the dryness and pedantry of its latter days prevent our vision of the earlier time when the passion for knowledge bore up the world, and sought even to contain it. That dogma is not eternal is manifest to every wanderer in the streets of Toledo, yet the historian may well recall us to the study of a time when, by mystical or intellectual inspirations, men strove eagerly to know the meaning of life, its origins, and its issues; and may lead us to the discovery of the seeds and wells of its fertility. The Greeks prophesied that before man can determine his place

and service in this world he must form some theory of the world as a whole; the ages of faith prophesied that great deeds must be born of great faith and of great conceptions.

To those who live only in the past, or only in the present, there seems in the discriminations of the comparative historian to be a certain cold-bloodedness. Are not the ears of this critic, so aloof from the murmuring of creed and controversy, are they not deaf to the voices of the spirit which he would interpret to us? A distinguished bishop who was among my hearers, with the fervour and gentle humour so well known in him, rallied me not for celebrating science but for putting religion to rout. Yet in our own day surely the argument is changed, not in form only but in very nature; so changed by the conceptions of evolution, which have entered the mind of churchman and layman alike, that not a few speculative beliefs are changing sides without the knowledge of the disputants; and he who thinks himself a defender of the faith may have joined the revolt. But if we no longer carry the colours of the troops of the past we shall collect our lessons from its strategies; and for one of these lessons a prelate of the King will give thanks with me, that his supremacy has palsied the arm of the inquisitor to strengthen that of the apostle.

An unsystematic reader of a subject finds it out of his power to make due acknowledgment of the help and advantage derived from expert authors. Much of the matter had seeded itself insensibly in his brain in the course of general reading and conversation; much of it again had been obtained more carefully

from sources now forgotten. To the following authors I know I am profoundly indebted, as I am to many others to whose names and works I can now give no reference:

Hauréau, *La Philosophie Scolastique*, Ed. 1872;

Jowett, *Dialogues of Plato* (vol. III. p. 523);

Jourdain (Amable), *Recherches critiques*, Paris 1848;

Jourdain (Charles), *Excursions historiques*, Paris 1888 (and the *Philosophie de St Thomas* of the same author);

Ampère, *Histoire litt. de la France avant le XII^{me} siècle*;

Brucker's *Historia Critica Philosophiæ* (English Ed., 1791);

Renan, *Averroès*, Paris 1866; the *Philosophie périp.* apud Syros; and the *Peuples Sémitiques dans l'histoire de la civilisation*, of the same author;

Roger Bacon, *Westminster Review*, 1864, two Articles (by Thomas Marshall, M.A. Oxon.);

Schmidt, *Essai sur les Mystiques du XIV^{me} siècle*;

Benn, A. W., *The Greek Philosophers*, London 1882 (and many helpful essays in periodical literature);

Zeller, *Die Philosophie der Griechen*, 1881;

Krische, A. B., *Theologische Lehre d. Griechischen Denker*, Göttingen 1840;

Ueberweg, *Grundriss d. Gesch. d. Phil. des Alterthums*, Berlin 1867;

Gerlach und Traumüller, *Gesch. d. physik. Experimentierkunst*, Leipzig 1899;

Rashdall's *History of Universities*; Haeser, *Geschichte der*

Medicin, Jena 1875-82;

Baas, J. H., *Gesch. d. Medicin*, Stuttgart 1876;

Idem, *Die geschichtliche Entwicklung des ärztlichen Standes*, Berlin 1896;

Charles Daremberg (all his works);

Rousselot, *Études sur la philosophie dans le Moyen Age*, 1840;

Pattison, Casaubon, 1875;

Meunier, Francis, *Essai sur la vie et les ouvrages de Nicole Oresme*, Paris 1857.

Descartes, *Epist. Cartes*. 4to. Amst., 1668;

Plumpius, *Fundamenta Med. Fol.* Lovan., 1652;

Sylvii *Op. Omn.*, 1679, p. 875;

Haller, *Elem. Physiol.*, 1757, I. 3;

Tiedemann, *Physiologie de l'homme*, Paris 1831, I. 41;

Delle Chiaja, *Instituzione di Anatom. e Fis. Comp.*, 1832, I. 13.

(The six last works are cited as being especially useful, among many others, to show the extent to which modern physiology, from Harvey onwards, is based upon vivisection; and that it could not have arisen or thriven otherwise. It was by the test of many vivisections that Plumpius was led to the honourable withdrawal of his opposition to Harvey.)

INTRODUCTION ¹

IN the many Harveian Orations which have been delivered since the death of the founder of modern physiology the direct aspects of his honour and of his work have been exhausted; of late years the orators have concerned themselves with indirect aspects. Some of my friends have said to me that they lack a perspective view of Harvey and his work; that even highly educated men have little sense of his relation to medieval thought, or of the evolution of medieval into modern thought. Of the several stars of the constellation – of Copernicus, Gilbert, Galileo, Harvey – they had some knowledge; but how came Harvey to be at Padua? how did science spring up in North Italy? did science arise out of the womb of medicine, or contrariwise? why did natural science not flourish in the thirteenth century, and was it not a great misfortune for Europe that it did not then flourish? what were the systems of thought which in the Middle Ages preceded, encouraged or thwarted the travail of the human mind, and what of good or ill do we owe to them? These and

¹ To bring the oration within the time allotted, this portion, and the paragraphs on astrology added as an appendix, were omitted. For the same reason the paragraphs on scepticism (p. 82) were also omitted but by inadvertence have held their continuity in the text. It is customary to print the text as delivered; and this must be my excuse for the cumbrous apparatus of notes, much of which might have been taken into an enlarged text. The notes are necessary to fortify statements which orally may pass, but do not satisfy a reader.

such questions it seemed not unfitting that a Harveian Orator of this latter day should consider. Now on the philosophy of the Middle Ages, and on its relation to the era of positive science of which Harvey was perhaps the chief pioneer, there lay in a drawer in my cabinet the confused and occasional notes of many years. An interest in this thorny subject, sown in my mind at first by accident, and reawakened by these enquiring friends, had for me the charms of an old fancy, and I trust some brief essay thereon may have a temporary service; if, that is, I can touch the imagination of my hearers, and after some broken fashion bring before them a vision of the nations swayed hither and thither upon the face of Europe by a thirst for knowledge of a kind different, both in its methods and in its aims, from our own.

This oration cannot have the merit of an original study. Had I the equipment I have not the leisure to carry my investigations to the sources. Yet I may have attained to some maturity of judgment herein by long occupation of my mind since, in 1863, my old friend Mr Thomas Marshall of Leeds, sometime of St John's College, Oxford, interested me in the life and work of Roger Bacon, the only eminent forerunner of the great naturalists of the seventeenth century.

The art of the Middle Ages and the social and political history of the time have fascinated modern Europe; for medieval thought, though its phrases survive in their mouths, few persons have shown any care: yet to these conflicts we owe what we are. No great battles of mankind have been fought in vain; none of its

great captains has deserved oblivion. Yet we shrug our shoulders at their uncouth or outlandish names; we assume that from their chairs there issued naught but rhetoric, casuistries and fallacies, and that their multitudinous disciples were silly moths.

Each period of human achievement has its phases of spring, culmination, and decline; and it is in its decline that the leafless tree comes to judgment. In the unloveliness of decay the Middle Ages are as other ages have been, as our own will be: but in those ages there was more than one outburst of life; more than once the enthusiasm of the youth of the West went out to explore the ways of the realm of ideas; and, if we believe ourselves at last to have found the only thoroughfare, we owe this knowledge to those who before us travelled the uncharted seas. If we have inherited a great commerce and dominion of science it is because their argosies had been on the ocean, and their camels on the desert. "Discipulus est prioris posterior dies"; man cannot know all at once; knowledge must be built up by laborious generations. In all times, as in our own, the advance of knowledge is very largely by elimination and negation; we ascertain what is not true, and we weed it out. To perceive and to respect the limits of the knowable we must have sought to transgress them. We can build our bridge over the chasm of ignorance with stored material in which the thirteenth century was poor indeed, we can fix our bearings where then was no foundation; yet man may be well engaged when he knows not the ends of his work; and the schoolmen in digging for treasure cultivated the field

of knowledge, even for Galileo and Harvey, for Newton and Darwin. Their many errors came not of indolence, for they were passionate; not of hatred of light, for they were eager for the light; not of fickleness, for they wrought with unparalleled devotion; nor indeed of ignorance of particular things, for they knew many things: they erred because they did not know, and they could not know, the conditions of the problems which, as they emerged from the cauldron of war and from the wreck of letters and science, they were nevertheless bound to attack, if civil societies worthy of the name were to be constructed. How slow in gestation is the mother of truth we may see by comparing the schoolmen of the second medieval period with those of the first; in the enlargement of their view, the better furniture of their minds, and the deeper meaning of their distinctions: and when we compare with these later schoolmen the naturalists of the seventeenth century, we find not new acquirements only but also a new direction of the pursuit of truth.

It seems hardly comprehensible that great and stable societies have been built up on transcendental schemes of thought, upon conceptions poised as it were in the air. Without a system of morals no civil society could exist; yet if mankind must have waited for civil polity until some such system were built up from below, of scientifically tested materials, social constructions would have been virtually impossible. In morals, as in the arts, the art precedes the science; the intuitions of genius imagine social schemes of provisional validity, and new and lofty

standards of fitness. But a social fabric thus born of a vision can bear no rough handling; and even the solid builders who would make a more permanent foundation upon positive conceptions, while seeking more or less deliberately to underpin the fabric, may, and often do, shake it to ruin.

Hence in all guardians of morals the dread of meddling with the reigning vision of truth; hence its sanctity, that no man shall try the stuff of which it is made. And the dangers of heresies from within are more fearful than those of alien attacks; social cohesion, the end of it all, is thereby more exposed to disintegration. Yet nevertheless, as the generations of men change, and as knowledge increases, men see from new points of view; and thus while for some the reigning vision retains its apparent solidity, for others its rays are broken or dissolved. Even John Henry Newman was compelled to teach the relativity of truth, and that a doctrine of development must be accepted. For every provisional synthesis then the time must come when the apparition of truth can no longer command united allegiance, and criterions begin to encroach upon sanctions. Broader and more stable foundations have, it is true, been rising almost insensibly, yet it may be long ere the superstructure rise into the heavenly light; in the lower work many will see no beauty and no hope, others will see safety in its enlargement and solidity. By these indeed the visions of the imagination are apt to be forgotten, or in the pressure of intellectual verification even despised; the mean level of conception may not indeed be lower, it may haply

be higher, yet the highest, wherein truth may be revealed by illumination, is not divined in its full force, abundance and life. Great seers are wont to leave to others to find out, or even to care, what bottom they stood upon; yet only through transitory periods of a humbler duty than theirs can the bases be laid and enlarged for times of richer fruition. One of the profoundest of modern sayings was that of Freeman – that the end of modern material progress is to bring large societies up to the level of small ones.

This is the day of a great celebration; that on this anniversary I am worthy to take a place in the succession of your Orators is more than I dare to believe, that you have deemed me worthy is my encouragement. In private duty also I am bound to honour one of the greatest of the sons of the University of Cambridge, and the greatest member of the ancient and honourable house of Gonville and Caius College.

In some respects I am ill equipped for my office; of the history of the practice of Medicine from the time of Galen to the time of Harvey I am almost ignorant, I fear wilfully ignorant. Well indeed may we turn our eyes away from those centuries wherein one of the chief callings of man fell into unexampled and even odious degradation; yet I trust that in me this ignorance and this aversion may be compensated by some familiarity with the history of thought in the Middle Ages, a familiarity acquired during thirty-six years of abiding interest, and occasional study.

The discovery of the circulation of the blood by William Harvey is commonly regarded among scientific discoveries

as pre-eminent if not unique. I can quote but two opinions on this matter, both taken beyond our own land. In France, Dr Daremberg exclaims “Voici Harvey! Comme au jour de la création le chaos se débrouille, la lumière se sépare des ténèbres!” In Germany, Dr Baas says that Harvey stands alone in respect of the world of life; that his discovery of the inner working of the microcosm takes a place equal to, if not indeed higher than, those of Copernicus, Kepler and Newton in respect of the macrocosm. It will be my endeavour to show that these judgments are historically justifiable.

To put the discovery of the systemic circulation of the blood in its true light, we must have some notion of the history of philosophy, science and medicine. Medicine, and herein it is in contrast with Theology and Law, had its sources almost wholly in the Greeks. Not only in the doctrine of the four elements of Empedocles, a doctrine which has survived almost to our own day², and in the physical theories of Heraclitus and Leucippus, did medicine, for good or ill, first find a scheme of thought, but in the schools of Hippocrates and of Alexandria it was based also, and far more soundly, upon natural history and anatomy. The noble figure of Galen, the first experimental physiologist

² The “humoral doctrine” is imperfectly known. The four *elements* are earth, water, air, fire; the four *qualities* are hot, cold, moist, dry; the four *humours* are blood, phlegm, yellow bile, black bile. By permutation of these were obtained the endless elaborations of the galenist doctrine which for many centuries blinded Europe not to the truth only, but also to the clinical and physiological methods, example, and attainments of Galen himself.

and the last of the great Greek physicians, portrayed for us by Dr Payne in the Harveian Oration of 1896, stood eminent upon the brow of the abyss when, as if by some convulsion of nature, medicine was overwhelmed for fifteen centuries. To the philosophy of medicine, Galen had given more than enough; to its natural history he had contributed in the following of Hippocrates; to its discoveries he had given the greatest of all means of research, individual genius; to its methods he had given, but in vain, that indispensable method, practised first perhaps in history by Archimedes and the Alexandrians, of verification by experiment; a method, after Galen, virtually lost till the time of Gilbert, of Galileo and of Harvey.

In the growth of human societies small civilisations, however exquisite, have been sacrificed to the formation of vaster and vaster congregations of men; thus only, it would seem, is an equilibrium to be reached of sufficient stability for the highest ends of mankind. Greece, beautiful as was her bloom, penetrating as was her spirit, perhaps because of her very freedom of thought, never became a nation; her city states were too wilful to combine. The Macedonian power broadened the foundation of polity eastward and westward; and this work was carried as far perhaps as sword and fasces could carry it by the power of Rome. But even the Roman peace, bought as it was at the cost of learning and the arts, was but a mechanical peace; in the wilder, more turbulent and more heterogeneous peoples of the later Empire the bodies but not the wills of men

were in subjugation. The great system of Roman Law, which Numa, the Moses of Rome, had invested with supernatural awe, had become but an external rule; even in Rome herself, poorer in people, poorer in commerce, poorer than ever in ideas, the sanction of patriotism was failing, and her citizens were held together for the most part by their baser and more dangerous passions³. For Eastern Europe the University of Constantinople established a compact and uniform system of thought, subtle prolix and acquisitive rather than original or profound; but in the West, under the Frank and later Northern devastations, the very traditions of learning and obedience were broken up; schools were closed, and even the art of writing was almost lost. Then it was that the cohesion and development of Western Europe were saved by a new and a wonderful thing. From the East, the home of religions, had spread, like an exhalation, Christianity, that religion which proves by its survival that it is the fittest sanction for the will of man. This religion, entering as a new spirit into the ancient fabric of Roman Empire, was to hold men's service in heart and soul as well as in body; yet to this end no mere mystic or personal religion could suffice: clothing itself with the political and ritual pride and even with the mythology of the pagan Empire it inspired a new adoration; but it imposed also upon Europe a catholic and elaborated creed. To preserve the authority of the common faith not only must every knee be bowed, not only

³ "Nec ullum satis validum imperium erat coercendis seditionibus populi, flagitia hominum ut cæremonias deum protegentis." Tac. Ann. iii. 60.

must every heart be touched, but to build and to repair its fabric every mind must also bring its service. How the scheme of the Faith was built up, how oriental ecstasy and hellenistic subtlety, possessing themselves of the machinery of Roman pomp, were wrought to this end, we may briefly consider.

As, politically, under Diocletian and Constantine the ancient world gave place to the new, so in the third century philosophy was born again in neo-platonism⁴, the offspring of the coition of East and West in Alexandria, where all religions and all philosophies met together. The world and the flesh were crucified that by the spirit, man might enter into God⁵. Pure in its ethical mood, neo-platonism, says Harnack, led surely to intellectual bankruptcy; the irruption of the barbarians was not altogether the cause of the eclipse of natural knowledge: to transcendental intuition the wisdom of the world had become foolishness. Yet even then, as again and again, came the genius of Aristotle to save the human mind. The death of Hypatia was the death of the School of Alexandria, but in Athens neo-platonism survived and grew. Proclus, ascetic as he was, was versed also in Aristotle; and he compelled the Eastern mysteries into categories: so that on the closure of the School of Athens by Justinian (a. d. 529) a formal philosophy was bequeathed

⁴ It must not be supposed that the idealism of Plato and the mysticism of the East were alike, or even akin. Plato was a Greek; his mind, as we appreciate such qualities, was sane and lucid: he had no yearning whatever for absorption in the Infinite; but rather, like Aristotle, for a noble life.

⁵ "Oftener on her knees than on her feet Died every day she lived." Macbeth IV. 3.

to the Faith; the first scholastic period was fashioned, and the objects and methods of enquiry were determined for thirty generations. From Aristotle Europe adopted logic first, and then metaphysics, yet both in method and in purpose Origen and Augustine were platonists; rationalised dogma lived upon dialectic, and conflicted with mysticism; but logic, dogma and mysticism alike disdained experience.

Thus, no mere external sanction, stood the Faith; threefold: from the past it brought its pompous ritual, it appealed by its subtle dogmatic scheme to the intellects, and by its devotion to the hearts of men. Through the mirage of it, when its substance had waned, Copernicus, Galileo, and Harvey had to steer by the compass of the experimental method. This was their chief adversity, and of other adversities I have to speak.

The visitor to the Dominican Church of St Catherine at Pisa will see on its walls St Thomas of Aquino with the Holy Scriptures in his hand; prostrate beneath him is Averroes with his Great Commentary, but beside him Plato bearing the *Timæus*. It was the fortune of the Faith that, of all the treatises of Plato, the *Timæus*, the most fantastic and the least scientific, should have been set apart to instruct the medieval world; that the cosmical scheme of the *Timæus*, apparelled in the Latin of Chalcidius, – for there were then no Greek texts in the libraries of the West, – should for some 500 years have occupied that theoretical activity which Aristotle regarded as the highest good of man⁶. Again,

⁶ I see in recent reports of Egyptian exploration that at Oxyrhynchus Plato was

those works of Aristotle which might have made for natural knowledge fell out of men's hands⁷, while in them, as Abélard tells us of himself, lay the Categories, the Interpretation, and the Introduction of Porphyry to the Categories, all in the Latin of Boetius⁸; treatises which made for peripatetic nominalism, but whereby men were versed rather in logic and rhetoric than in natural science. Thus Plato's chimera of the human microcosm, a reflection of his theory of the macrocosm, stood beside the Faith as the second great adversary of physiology.

The influence of authority, by which Europe was to be welded together, governed all human ideas. As in theology was the authority of the Faith, so in the science and medicine of the first period of the Middle Ages was that of the neo-platonic doctrines,

represented with curious persistence by the Phædo and the Laches; and these treatises appear in the early Fayyum papyri.

⁷ A few axioms, collected from the physical and metaphysical treatises (perhaps by Cassiodorus from Boetius), were current from an early date. The translations of Boetius must for a time have lain in some neglect?

⁸ Alcuin had but a translated abridgment or summary of the Categories, attributed to Augustine; and in a MS. of the tenth century we find no more than this. Boetius' full translation of the Categories was not current till the end of this century, when all the logic of Aristotle was in the hands of the doctors. In the earlier Middle Ages, as in the writings of John of Salisbury and of William of Conches, we hear even more of Boetius than of the master himself. Virgil, Seneca and Cicero also were the sources of much of the culture of this period. Alcuin was a grammarian; he taught from Priscian and Donatus, improved the eighth century Latin, and probably made Virgil and Cicero known in Gaul and Britain. He knew but little Greek, as we infer from his quotation of the names of the Categories. Erigena knew more Greek and carried some of it to the Court of Charles the Bald. See note 2, p. 65. Alcuin probably did not visit Ireland. Boetius had translated also both Analytics and the Topics.

and, in the second period, of the Arabian versions of Galen and of Aristotle; furthermore in this rigid discipline metallic doctrine almost necessarily overbore life and freedom. It is not easy for us to realise a time when intellectual progress – which involves the successive abandonment of provisional syntheses – was unconceived; when truths were regarded as stationary; when reasons were not tested but counted and balanced; when even the later Averroists found final answers either in Aristotle or in Galen⁹. Thus in the irony of things it came to pass that Harvey was withstood by the dogma of Galen who, in his own day, had passionately appealed from dogma to nature.

Porphyry of Tyre, who lived in the 3rd century, may be called the founder of both Arabian and Christian scholastics. He was an Alexandrian, but of peripatetic rather than platonic opinions. In the *Isagoge*, or Introduction to the *Categories*, already mentioned as translated by Boetius about 500 a. d., he set forth plainly a problem which during the Middle Ages rent Western Europe asunder; a problem which, says John of Salisbury¹⁰, engaged

⁹ Yet Roger Bacon seems to have apprehended both progress and the relativity of truth. Before Newman, he declared that God makes no full revelation but gives it in instalments; and in another passage he speaks of the judgments of Aristotle, and of other great teachers, “*secundum possibilitatem sui temporis ... aliud tempus fuit tunc, et aliud nunc est*” – a remarkable saying. Of the Saints he says “they had their time, we have our own.” Vid. also note, p. 80.

¹⁰ Modern French historians do us the honour of annexing our heroes; in respect of the scholars of the Middle Ages M. Charles Jourdain has set, or followed, this example. John of Salisbury, that charming child of renaissance, born out of due time, was first claimed as a Frenchman; then, as this “provenance” becomes untenable, he,

more of the time and passions of men than for the house of Cæsar to conquer and govern the world; one indeed which even in our day and country is not wholly resolved.

The controversy lay between the Realists¹¹ and the Nominalists; and the issues of it, in the eleventh century, – at which time the “Dark Ages” passed into the earlier of the two periods of the Middle Ages, – were formulated on the realist side by William of Champeaux, while the Breton Rouselin, or

and others, are called “Anglo-French.” The University of Paris in the XIIIth century was no more France than Rome was Italy. In our sedentary arable life we do not realise the nomad habits of our forefathers. Edward the First would inhabit six distant castles in less than as many weeks; indeed Great Britain itself was then no island. The heroes, nay the armies, of Froissart’s Story fly about the world in their seasons like migrating birds. All keen scholars of the West went to the University of Paris, the daughter of kings and popes, and the intellectual centre not of a strip of kingdom between Anjou and the Empire, but of Europe itself. And of the scholars of Paris, Englishmen were, we hear, the most turbulent, but the boldest in argument and the most greedy of learning; this last character perhaps it is that now-a-days looks least English. Kuno Fischer admires the procession of great Englishmen down the highway of medieval thought, from Erigena to Francis Bacon. John was born at Salisbury, spent thirteen of his early years at the University of Paris, the best of them in the stormy service of Thomas Becket, and but the last five as Bishop of Chartres. We do not call Lanfranc an Englishman, nor even Adrian the Fourth an Italian.

¹¹ The name Realism has been improperly used – improperly because previously engaged – to signify the conception of an objective world, from the play of which our impressions arise, and of which our impressions are, if not likenesses, at any rate symbols, as opposed to the name “Idealism” which, with a like violence, has been turned to signify the conception that the universe of things is but a picture produced by the evolution of the phenomena of consciousness. The proper names for these opposite conceptions are of course Noumenalism and Phenomenalism. Realism proper as a habit of thought, whatever may have been its provisional uses, is now a mischievous habit; noumenalism is a harmless amusement.

Roscellinus, had the perilous honour of defining them on behalf of the nominalists¹². To see the depth of the difference we must step back a little, to a time when metaphysics and psychology were not distinguished from other spheres of science¹³, and all research had for its object the nature of being. Plato himself held ideas not as mere abstractions but in some degree as creative powers; and we shall see how potent this function became in the thought of the Middle Ages when, in the ardour of research into the nature of being, the modes of individuating principles were distinguished or contrasted with an ingenuity incomprehensible to Plato or Aristotle, or at any rate undesired by these greater thinkers. Aristotle avoided the question whether form or matter individuate; he held that there is no form and no matter extrinsic to the individual. But by the medieval realist every particular, every thing, was regarded as after some fashion the product of universal matter and individual form. Now “form” might be regarded, and severally was regarded, as a shaping, determinative force or principle, pattern type or mould, having real existence apart from stuff, or, on the other hand, as an abstract principle or pattern having no existence but as a conception of the mind of the observer. The realists roundly asserted that form is as actual as matter, and that things arise by their participation –

¹² Roscellinus, the Roger Bacon of the eleventh century, learned, rebellious, lucid and heroic, withstood the Church for philosophy as did Bacon in the thirteenth for natural science. It would seem that in heroism at any rate Abélard was below his master.

¹³ Vid. p. 50.

without whiteness no white thing, without humanity no man; and not individuals only: for the realist, out-platonising Plato, genera and species also had their forms, either pre-existent (“universalia ante rem”), or continuously evolved in the several acts of creation (“universalia in re”). Indeed for the extreme realist every “predicamental modality” was “aliquid ens separatum”; for instance, the soul, the active intellect, the passive intellect, and so on: conversely, by fusing idea with will, for other philosophers realism would get pushed back into efficient reason or divine will, and almost vanish¹⁴. By this latter route the Sorbonne, originally opposed to the Thomists, became nominalist after all; as did those once pious realists the Augustinians and Cistercians. Setting aside then the extreme nominalists, who would have dissolved thought by declaring all creatures to be so individual as to be incomparable, – “pulverising existence into detached particulars,” as some one has put it – and that names of kinds are mere nouns, or indeed mere air (“flatus vocis”), the prevalent nominalists were content to deny to ideas, forms, principles, or abstractions any other existence than as functions of the human mind – as subjective conceptions. For Ockham, says Hauréau, an idea was but a modality of the thinking subject. Abstractions

¹⁴ The opponents of the theory of the Mass are apt to charge the Roman Church with the proposition that therein the elements are changed into “real” flesh and blood. In the nineteenth century, as in the thirteenth, this Church has not, I believe, determined whether the “real” substance be corporeal or incorporeal, separable or inseparable from the sensible properties of things; whether in a word it be something or, as many of us would say, nothing at all. Spinoza regarded “substance” as intelligent and extended.

then for these thinkers were but mental machinery for analysis of the concrete. Aristotle was as obscure and inconsistent in his language herein, and often elsewhere, as he was profound and scrupulous; but when his works came to be studied as a whole, and in the original tongue, the influence of his method, rather than the close consistency of his language, told against realism: virtually he was a conceptualist, and he found reality, where Plato denied it, in the particular object of sense¹⁵.

Even Francis Bacon, who was deeply indebted to Aristotle, never extricated himself from the tangle of form, cause and law¹⁶.

¹⁵ Thus it was difficult to claim his authority for one side or the other. The metaphysical treatises were not known till the later part of the twelfth century. (See p. 75, note 2.) At the outset of the *Physics* Aristotle discusses what nature is in itself, and defines first elements; in the *Second Analytics* on the other hand, although thinking of science as deductive and expository, he strongly opposes the primary existence of ideas, though these are predicable of many individuals. By excess of logical formations, the division of properties, the use of such terms as “γένη ὑποκείμενα,” &c. &c., he laid himself open to misconception, and so was readily platonised by his commentators. It would seem indeed that for Aristotle universals were not merely propositions obtained by negation of individual variations, but something more active. A νόησις became somehow a ποιήσις; e.g. “ἡ δημιουργήσασα φύσις.” His position may be appreciated briefly thus: – In the *Categories* Aristotle speaks of individuals as primarily existent, while in *Met. z*, and elsewhere, the primary existent is the form. The inconsistency is, however, more apparent than real; for in the *Categories* it is the individual so far as he represents his natural kind which is primarily existent, whilst the form which in the *Metaphysics* is primarily existent occurs only in the individual. This terse appreciation is one of my many debts to Dr Jackson.

¹⁶ It were almost to be desired, for our own lucidity, that we could get rid of the words cause and law, and use language significant of order only. Aristotle’s influence has weighed heavily in favour of studying “Causes” rather than sequences; thus it is hard to clear our own minds, and impossible to clear the minds of our pupils, of a

Now this was a great argument, no empty dispute; the bones of dead controversies cumber the ground, but no controversy was empty which moved profoundly the minds and passions of men: both for ecclesiastical and secular thought the dispute was grave. While realism was essential to the Church – for instance, on realist grounds St Anselm defended the medieval doctrine of the Trinity against Roscellinus; the Church herself claimed a real existence apart from the wills of successive generations of individual and variable men; she taught that Man had fallen not only in many or all individual cases, but as a kind having a real existence¹⁷, and again that in the Mass there is change of hypostasis¹⁸– while then realism was essential to the Faith, yet if forms pre-exist (“ante rem”) then the acts of God must be predetermined – “fatis” non “avolsa voluntas”; or if forms are only “in re” God must be form, living in each and every act and thing, which is Pantheism (“materia omnium Deus”): an impersonal conception and a dissolution of dogma which the Church must and did abhor. “Pessimus error” – there is the abyss, cried Albert, avoiding it by dialectical juggles. Erigena,

genetic notion of causation – that an effect comes, as it were, from the womb of its causes. Even Ockham taught as if causes contained their effects. Mr Marshall (West. Rev. loc. cit.) is of opinion that Roger Bacon by his “non oportet causas investigare” intended to confine scientific thought to the relations of phenomena.

¹⁷ As St Anselm put it, “Participatione speciei plures homines sunt unus homo.” Out of humanity individual men proceed.

¹⁸ Vid. p. 32, note.

the brilliant prophet and protestant¹⁹ of the first period of the scholastic philosophy, was virtually a pantheist after the pattern of Parmenides²⁰; as Spinoza was the last great realist. David of Dinan again was such a pantheist, though luckily for him the Church did not find it out till he was dead; and he was martyred only in his bones. Indeed the great Robert of Lincoln barely escaped the accusation of pantheism under the wing of Augustine. The heresies of David, and of Amaury, caused the reaction of the first years of the 13th century against Aristotle. Amaury seems indeed to have cleared out Christian dogma pretty thoroughly, and to have preached the coming of science as the “third age” of the world. Many of his followers were sent to the stake; by the Synod of Paris (1209) the works of Aristotle were proscribed, and many copies of them burned. This proscription was virtually withdrawn by Gregory the Ninth in 1231; and Hales, Albert and St Thomas devoted themselves again to the study of Aristotle, and established his supremacy²¹.

¹⁹ Erigena, “the miracle of the Holy Ghost”; a figure of almost mythical grandeur, arising in the far west, full of new learning, of lyric enthusiasm, and heroic courage. He did not protest, with St Columba, against the Papacy only; he protested against authority, and he protested against mighty ignorance; neither of which should withstand the persuasion of right reason. “Ratio immutabilis ... quæ ... nullius auctoritatis adstipulatione roborari indiget.” His works were proscribed and burned.

²⁰ The one, to which alone Parmenides and Melissus attributed existence, was a material although an incorporeal unity. We must beware of accepting “matter” in the current dualist sense; for Aristotle himself ὕλη was hardly distinguishable from δύναμις.

²¹ With every allowance for the phases of church and school in successive academical

Indispensable then as realism was for the Church, its creed, and

generations it seems strange that in 1209 Aristotle should have been forbidden under excommunication, and in 1231 restored to such favour that for the disciples of Albert and St Thomas the master almost attained the authority of a father of the church; the explanation probably is that “Aristotle” meant for a time the paynim interpretations of Toledo, particularly of the Physics (the Metaphysics were not translated from the Greek till about 1220); and meant not this only, but also liberal quotation and incorporation of the writings of Arab philosophers. To show how learning, even in the University of Paris, lay under ecclesiastical control, some extracts from the Edicts of the Synod of Paris and of Gregory the Ninth may be cited in illustration: – After directing that “Corpus magistri Amaurici extrahatur e cimiterio, et projiciatur in terram non benedictam” the Synod farther orders that the “Quaternuli [“Quaternuli” is translated by Ducange, Quatuor quartæ chartæ, seu octo folia: i.e. the octavos] magistri David de Dinant, ... afferantur et comburantur; nec libri Aristotelis de naturali philosophia, nec Commenta legantur Parisiis, publice vel secreto. Et hoc sub pœna excommunicationis inhibemus... De libris theologicis scriptis in romano, præcipimus quod episcopis diocesanis tradantur, et Credo in Deum et Pater noster in romano, præter vitas sanctorum.” The order two years later confirming these prohibitions differs but in form. Even the Bull of Gregory in 1231, relieving the schools of this proscription, says, “Ad hæc jubemus ut magistri artium unam lectionem de Prisciano et unam post aliam ordinarie semper legant, et libris illis naturalibus, qui in concilio provinciali ex certa causa prohibiti fuere, Parisiis non utantur, quousque examinati fuerint, et ab omni errorum suspicione purgati.” The pope adds paternally, “Magistri vero et scholares theologiæ, in facultate quam profitentur, se studeant laudabiliter exercere, nec philosophos se ostendant, sed satagant fieri theodoti: nec loquantur in lingua populi, et populi linguam hebræam cum azotica confundentes” [azotica or arethica means the profane tongue (Ducange); Hebrew being a Sancta lingua]. The pantheistic outburst of the later twelfth century, although deriving in part from Erigena, was probably fed by the commentary of Alexander of Aphrodisias. This commentary was widely read in Arabic and Arab-latin translations, the latter of which were made, as we know (v. A. Jourdain, p. 123 and seq.), by Gerard of Cremona (d. 1187). Alexander’s more material interpretation of ὕλη involved the return of All into God; hence no resurrection, no future life. In his followers these doctrines become grosser and grosser, and, fused with other Arabian doctrine, prepared for and afterwards

its sacraments, yet therein it found itself in a dilemma between the conceptions of a Creator working under conditions, and of a spirit immanent in matter; and when theological philosophy culminated in St Thomas, and was fixed by him as it now rules in Rome, this difficulty was rather concealed in his system than resolved²². Every scheme of thought must make some declaration on the nature and place of universals; the problem was no hair splitting²³, it dealt with the very nature and origin of being; it

strengthened the Averroism of Padua, in the xv-xvith century, in which system it was taught that the universal soul, dipping for the time into the individual man, is at death resumed into the universal soul. This virtual denial of personal immortality was of course bitterly resented by the Church. (Vid. p. 68, note.) Thus from the thirteenth century onwards pantheistic infidelity survived and even defied the menaces and the punishments of the Church.

²² Both Albert and Aquinas were inconsistent. Hauréau points out that St Thomas was a vitalist in physics, an animist in metaphysics, a nominalist in philosophy, and a realist in theology. “Il a cherché à reconcilier des morts (i.e. Plato and Aristotle) qui, toute leur vie, se sont contredits.” But even sceptics contradict themselves; and it is fair to add that St Thomas pushed universals back to immanence in the Divine mind. For Plato the ideas are thoughts of universal mind; for Aristotle God, or Nature by its thoughts or plans determines the lines of phenomena: thus Plato and Aristotle were more alike than Thomas knew, or Hauréau admits. There was no such thing of course as The Scholastic Philosophy, of which I read again but the other day in a modern work. Scholasticism is the very various teaching of the schools of the xi-xvth centuries; though its general tendency was to search rather into the origin and nature than into the functions of being. The philosophy of the thirteenth century on the whole was eclectic; – though perhaps eclectic by confusion rather than by reconciliation. The rule of authority prevented an appreciation of the relative values of opinions; the recognised authorities were equally true, and had to be dovetailed together somehow. Critical interpretation had not begun.

²³ The objection should not lie against hair splitting, for thought cannot be too

agitated the minds of thinking men at a time of the most fervid and widespread enthusiasm for knowledge which the Western world has ever known, – at a time when Oxford counted its students by thousands, and when in Paris a throng athirst for knowledge would stretch from the cloisters of the Mathurins to the faubourg of St Denis²⁴; and, in respect of our theme of this day, we shall see that even Harvey was embarrassed by certain aspects of it.

For, to resume, closely allied to the argument concerning universals was that concerning “form and matter.” Whether the terms used were “form and matter,” force or energy or “pneuma” and matter, “soul or life” and “body,” “determinative essence and determinate subsistence,” “male principle and female element,” “archæus and body,” the potter and the clay of the potter; or whether again they were “type and individual,” “cause and effect,” “law and nature,” “becoming and being,” or even the “thought and extension” of Descartes, the riddle lay in the contrast of the static and dynamic aspects of things; in the incessant formation of variable and transitory individuals in the eternal ocean of existence²⁵.

penetrating; but against the splitting of imaginary hairs.

²⁴ M. Charles Jourdain thus describes the procession of Rector, doctors and disciples of the University of Paris at the beginning of the fourteenth century. At the end of this century its decay began.

²⁵ For Aristotle the principle of individuation was matter and form (vid. note, p. 33); for Averroes it was form; for St Thomas it was matter. For all “vitalists” the identity of form, soul and life is essential; thus Stahl regarded soul as bestowing on body all

“Spiritus intus alit, totamque infusa per artus
Mens agitat molem, et magno se corpore miscet.”

For early thinkers, untrained in the methods and unaware of the limits of thought, even for the great and free thinkers of Greece, a captivating analogy was irresistible²⁶; while inventing schemes of thought they believed themselves to be describing the processes of nature. Moreover it has been the temptation of philosophers of all times, and even of Harvey himself than whom none had put better the conditions of scientific method, to suppose that by means of abstraction kinds may be apprehended; that thus they may get nearer to the inmost core of things; that by purging away the characters of individuals they may detect the essence and cause of individuation (σπερματικὸς λόγος): not perceiving indeed that the content of notions is, as Abélard had pointed out plainly, in inverse proportion to their universality. Like Sidney’s hooded dove, the blinder they were the higher they strove²⁷. For example: from a lump of silver a medal is

activity, as determining all vital functions. In Aristotle ψυχή is untranslatable = anima and animus – soul and vital principle. Πνεῦμα again in various writers may mean anything, from air to spirit or other essence; cf. Arist. De Generat. An. ii. 3, and the “aura” of Harvey, and even of Haller in the same connexion as the fertilising element.

²⁶ Not for all, not for the greatest of them! Aristotle, in vain, warned later generations against prophesying what seems likely, instead of looking to see how things come about: – “οὐκ ἀληθῆ λέγοντες, ἀλλὰ μαντευόμενοι τὸ συμβησόμενον ἐκ τῶν εἰκότων, καὶ προσλαμβάνοντες ὡς οὕτως ἔχον πρὶν γινόμενον οὕτως ἰδεῖν.” (De Gen. Anim. IV. i.) “Croire tout ce qu’on rêve,” if useful and possibly admirable in its day, in “neo-Hegelians” is a little stale.

²⁷ Thus, in ascending from general to more general, in the most general will be

struck; from many lumps of silver many medals are struck, each different from the other: let us eliminate as accidents the notions of silver, of the blow of a hammer, even of particular features of the devices, and we shall reach the idea of an agent with a type or seal, or of such an agent with many seals, or ideas, who may thus individualise indifferent matter; or, to penetrate deeper into abstraction, who may transfer forms of his own activity to motionless stuff. It is my part to-day to show that before motionless stuff – before the problem of the “primum” mobile” – even Harvey himself stood helpless; helpless yet fascinated by the indulgence of invention when, in the *De motu cordis*, or the *De generatione*, he permitted himself to carry contemplation beyond the sphere of his admirable experiments. “Natural, vital and animal spirits” indeed he would have none of; saying well that he should want as many spirits as functions, and that to introduce such agents as artificers of tissues is to go beyond experience: yet in his need of a motor for his machine he was not able to divest himself of the language nor even of the philosophy of his day; he referred the cause of the motion of the blood, and

sought unique and perfect being; the primary cause and sole object of science – the *αὐτοζῶον* of the Alexandrians: whereas by successive eliminations utter abstractions would become utter vacuity. To such realists all subordinate beings are integral parts of the primary being. It would serve no useful end here to analyse these doctrines, or to indicate the pythagorean or stoical elements of them; for platonists and realists had their schools and degrees of subtlety; and Plato himself was inconsistent. Some brought secondary agents – demiurges or angels – into more creative activity, others carried creative reason back to the ideal good, and so on.

therefore of the heart, to innate heat²⁸. In his day he could not but regard rest and motion as different things; and motion as a super-added quality. In denying the older opinion²⁹ that the heart is the source of motion, of perfection³⁰ and of heat, he put the difficulty but one stage back; and, when in the treatise on Generation he propounded his transcendental notion of the impregnation of the

²⁸ Held by Gilbert, and attributed to Averroes; but older than Averroes. In turning to Francis Bacon's hypothesis I read (Ed. E. and S. ii. 263. Hist. Densi et rari – chapter, "Dilatationes per spiritum innatum se expandentem," a Paracelsian sort of chapter) "Pulsus cordis et arteriarum in animalibus fit per irrequietam dilatationem spirituum, et receptum ipsorum, per vices." The muscular quality of the heart was known to Galen, forgotten, and rediscovered. Spiritus vitalis, for Bacon, was "aura composita ex flamma et aere" (cf. *Æn.* vi. 747). Glisson has been fortunate in two generous judges, in Haller and Virchow; it would ill become me to depreciate a distinguished Fellow of my own College, and as a clinical observer Glisson had considerable merits; but as a physiologist he was sunk in realism. He was happy in the invention of the technical term "irritability," but for him this virtue was as metaphysical an essence as the vital spirit; his prime motor was not physical. As a philosopher I fear the independent reader of his works will find him fanciful and wearisome.

²⁹ Herein Harvey's sagacity brought him towards the truth. "Air," he says in the *De generatione*, "is given neither for the cooling nor the nutrition of animals ... it is as if heat were rather enkindled within the foetus (at birth) than repressed by the influence of the air." Boyle (who says that he worked under the influence of Harvey's discoveries) carried this matter forward by most interesting and sagacious experiments with his air-pump. For the layman, I may add that (to speak generally) before Harvey's time respiration was regarded not as a means of combustion but of refrigeration. How man became such a fiery dragon was the puzzle!

³⁰ Perfection was attributed, not only by medieval philosophers but also by Plato and Aristotle, to the circle. Circular movement was therefore the most perfect, and therefore again must be that of the planets. This is a good illustration of the almost necessary tendency in the earlier excursions of thought to equate incoordinates, and to fill gaps in reasoning from alien sources.

female by the conception of a “general immaterial idea,” we find in him realism still very much alive indeed. Had Harvey been content with innate heat he would have done well enough; but the innate heat of the blood, as he explains it, is not fire nor derived from fire; nor is the blood occupied by a spirit, but is a spirit. it is also “celestial in nature, the soul, that which answers to the essence of the stars ... is something analogous to heaven, the instrument of heaven.”

In denying that a spirit descends and stows itself in the body, as “an extraneous inmate,” Harvey advances beyond Cremoninus, who then taught in the chair of Averroistic philosophy in Padua; for, says Harvey, I cannot discover this spirit with my senses, nor any seat of it. In another passage indeed Harvey warns us “not to derive from the stars what is in truth produced at home”; in yet another he tells us that philosophers produce principles as indifferent poets thrust gods upon the stage, to unravel plots and to bring about catastrophes: yet he concludes that “the spirit in the blood acting superiorly to the powers of the elements, ... the soul in this spirit and blood, is identical with the essence of the stars.”

Thus the riddle which oppressed these great thinkers, from the Ionians to Lavoisier, was in part the nature of the “impetum faciens³¹” – of the *Bildungstrieb*. What makes the ball to roll?

³¹ Not only movement but also formative activity. The ἀρχὴ τῆς κινήσεως is the efficient cause of Aristotle; for him final causes direct motion – the οὐ ἕνεκα. Thus dialectic was taken for dynamics. Even Kant confused cause and effect with reason and consequence in hypothetical propositions (Benn). Caverni (*Storia del methodo*

Does heart move blood or blood move heart; and in either case what builds the organ and what bestows and perpetuates the motion? Albert of Cologne, and at times even Aristotle, as we have seen, were apt to leave moving things for abstract motion, and to regard formulas as agents. Telesius again, the first of the brilliant band of natural philosophers in Italy of the xvith and xviith centuries, was still seeking this principle of nature in the “form” of the peripatetics. Gilbert regarded his magnetic force as “of the nature of soul, surpassing the soul of man.” Galileo, although willing to conceive circular motion as perpetual³²

experimentale in Italia, 1891-5) says that Jordanus Nemorarius (of Borgentreich near Warburg, d. 1236) made the great advance of extending the static physics of the ancients to establish dynamics; and that he introduced the word “moment.” In a cursory survey of the two works of Nemorarius which we have in Cambridge I have not been able to verify this statement; the notion I have found but not the word itself.

³² Vid. p. 44, note 2.

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