

THE INFLUENCE OF SCIENCE
ON FRENCH LITERATURE
FROM THE MIDDLE AGES
TO THE NINETEENTH CENTURY



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**The Influence of Science on French Literature
from the
Middle Ages to the Nineteenth Century.**

Foreword

To the scientist, who turns to the study of French literature as a cultural diversion from the practical fact-finding processes of experimental science in its application to industrial development and commercial problems, the works selected as of first importance are likely to be those by writers who have attained fame in the domain of the natural sciences and philosophy as well as in the realm of literature. But as his acquaintance with the great writers of French literature increases and he sees in better perspective the milestones in its brilliant history, he is likely to recall and make a new application of the advice of Leonardo da Vinci (1),^x who said: "Etudie d'abord la science, puis la pratique née de cette science", and to ask himself what, if any, effect has been exerted on literature by scientists of the ages, through their writings and discoveries, their methods of reasoning, and what has been the bearing of their work on the habits and customs of the people.

^xNumbers in the text refer to the authorities consulted, of which a list appears on page 86.

In this study an attempt will be made to obtain an aperçu of the history of science in its relation to the history of French literature from the Middle Ages to the end of the 18th century and to determine the extent to which this literature was modified as a result of the gradual rise in the national appreciation of the relative importance of experimental science.

As a first step it will be convenient to define the terms in the title of the thesis in order to maintain that "clarity and precision" which science demands in the expression of thought.

Definitions

Science in its broadest sense is synonymous with learning and knowledge, but the significance of the term has varied through the ages. In its earlier stages, it comprised a knowledge of philosophy, astronomy and mathematics; later botany, chemistry and physics were added. In 1421, "thre sciences that ben Divinite, Fisyk, and Lawe", and again in the Middle Ages "the seven liberal sciences" often meant the "Trivium"

(grammar, logic and rhetoric), and the "Quadrivium" (arithmetic, music, geometry and astronomy). In relation to theology, science was defined in 1728 as including three parts: the science of mere knowledge, the science of vision, and there was a so-called "intermediate" stage between these two.

Knowledge also may be divided into two parts: vulgar or common appreciation of the scientific facts of nature, exemplified in the universal observation that the sun shines, the rain falls, day and night follow one another in regular sequence, the association of the seasons with broad changes in climatic conditions, all of which phenomena are universally accepted without question; and on the other hand the definition of knowledge according to its cause, which in turn may be determined by experimental methods, or deduced by reasoning or by a combination of both.

In general usage science is now understood to have a more restricted meaning and may be defined as "ordered knowledge of natural phenomena and of the relations between them"; thus, it is a short term for "natural sciences", and in this study the term will be used largely in this sense, the older definition being applied only in relation to the literature of the Middle Ages.

Literature has been defined as "le miroir de la race", the expression of the soul of a nation. It comprises many sections - lyric, dramatic, sacred and secular - each of which may be divided into many parts. Each main branch of knowledge has its particular literature; even scientific literature includes many different sections and a multitude of subjects. This broad field, obviously, is too extensive for the immediate purpose of this work, and hence it is necessary to limit the sense in which the term "literature" is used to a consideration of the written contributions of the scientists in the period under study in their relation to the works of those whose pens traced the ebb and flow of effort in the literary output of France and whose writings have been considered worthy of a lasting place in the standard references on the history of French literature. It is to be noted also that the literature of France alone is to be examined.

Influence may be of various kinds: moral, intellectual, et cetera, and in respect to literature may mean the introduction of new words into the vocabulary, the expansion of the meaning attached to words in common use to enable them to convey new and different

ideas; or the adaptation of familiar words by the addition of new endings, or a similar device; to press into use a new word that by its very form and derivation is readily understood by the reader. This, of course, is a very large subject and one on which there is an extensive literature.

Even as early as 1770 there appeared in Paris a work entitled "Dictionnaire des richesses de la langue française et du néologisme qui s'y est introduit".

There is also the effect produced on the "literary" writers by the works of those who, better known for their scientific achievements, have nevertheless won a recognized place in the realm of literature through the clearness and penetrating quality of their thought as expressed in their contributions to written records either in a special field of learning or in the more strictly intellectual sphere of poetry and prose.

In this study consideration of "influence" will be restricted to mean the effect of the scientific writers on the other writers of their time; the purpose is to assess in what ways and to what extent the writings of the recognized leaders in the French literary world were modified in style, vocabulary or matter from what they

would have been, if the scientists and scientific writers of the time had not appeared.

Time. - Finally it must be observed that the period to be covered is from the Middle Ages to the nineteenth century. For convenience, the part devoted to the Middle Ages begins with the twelfth century and includes the thirteenth, and the transitional period represented by the fourteenth and fifteenth centuries; there follow the parts dealing, respectively, with the sixteenth, seventeenth and eighteenth centuries.

The Middle Ages

Looking backward to the beginnings of physical science, it is not difficult to realize that even the primitive races must have gradually come to observe the orderly procession of many natural occurrences, such as the movement of the heavenly bodies. As their store of knowledge gained by observation grew, it is probable that one here and there tried a simple experiment of which the results formed the first steps in the march of science down through the ages. Similarly, the biological sciences had their beginnings in the observations made of plants and animals, particularly those

found useful to man. Varieties of foods produced varying effects, and led to the elementary notions not only of nutrition but also of medicine. Minor accidents and their treatment laid the foundations of surgery. But a long time had to pass, and a great amount of empirical information had to be made available before anyone realized the value of sorting the data and arranging it in anything like the ordered way that has been a fundamental feature of scientific records since time immemorial. Not, however, until this orderly arrangement was made, did man begin to ask himself questions about the meaning of the changes going on about him and to speculate as to their causes and their relationship to him and his welfare.

Eastern civilizations developed the heritage of scientific lore and before the intellectual activity of Greece was absorbed by the utilitarianism of Rome, which in its turn was lost in the Dark Ages following the barbarian invasion, the seeds were sown which were to germinate centuries later in more fruitful soil to form the beginnings of science as it exists to-day. During the Dark Ages, these "seeds" lay buried in the "Trivium" and the "Quadrivium".

In the 13th century, Latin translations of Aristotle were gradually recovered; his philosophy was re-imported into the schools of Europe and for 300 years Aristotle reigned supreme in European thought; exponents of the scholastic philosophy, ignoring their master's teaching on the need for experiment, settled questions of fact as well as those of opinion by an appeal to his books. But experiment was kept alive by the work of the alchemists who early in the 13th century caught their ideas from the Arabs and began to search for an elixir vitae and for a means of transmuting base metals into gold.

Here it will be opportune to comment briefly on the influence exerted at this time by the clergy and monastic orders on French society. During the Dark Ages the clergy alone had represented moral authority and the convents were respected asylums in which both traditions and texts were preserved. The secular clergy were in very close daily contact with their people; in fact as Des Granges says, "Social life moved, so to speak, to the rhythm of religion". All kinds of monks influenced society by their missions, their preaching, their work in agriculture, architecture, painting, teaching and scholarship.

Des Granges (3, p.74) observes that in the Middle Ages didactic treatises, both in poetry and prose, were more numerous than in any other period of French history. The clergy wrote upon all questions, scientific or moral, but what they sought above all, in the study of astronomy, of natural history, et cetera, was chiefly to inculcate a moral or religious principle by the use of examples.

In the Middle Ages all serious science was still written in Latin and for the most part was jealously hidden in the laboratories of the alchemists who feared to divulge it for fear of being regarded as sorcerers. Most of the savants of the period were monks, and ^{as noted above} it is probable that their chief motive in study was not the love of science but rather the desire to glorify God. Nevertheless very real progress was made in scientific achievements, particularly in astronomy, which, as a result of the development in the knowledge of mathematics, was gradually becoming separated from the astrology of the ancients. The names of Gerbert, Jean de Gerlande, Albert le Grand, Roger Bacon, Pierre d'Ailly, Saint Thomas d'Aquin and Raymond Lulle, are all associated with this period.

Scientific writings, being in Latin, were accessible only to the savants, who almost without exception wrote also in Latin. It can be readily understood, therefore, that the influence of science on "French" literature of this time was very small. The lay people lived apart out of touch with the knowledge of the savants and were content with the "dits, débats, Etats du siècle, ou du monde", characteristic of the time, or the stories of "Roland", "Lorrains", "Jugement de Renart", et cetera.

French literature, however, could not remain indefinitely segregated from serious reflection and philosophic thought; it could not remain forever apart from the science and scientific study of the learned teachers. Curiosity was awakened. Those of the people who had received superior instruction for the time perceived the interest in the studies of the clergy and sought to share this knowledge. The clerical instructors on their side did not despair of turning to good advantage, either for their students or for themselves, some knowledge of the science that up to then had been concealed from the populace in Latin tomes.

Of this movement, Gustave Lanson (4, pp.18-9) observes: "Des infiltrations, en quelque sorte, se produisirent de la littérature savante dans la littérature populaire, et l'on commença de mettre en français dès le XII^e siècle toute d'ouvrages didactiques, ouvrages d'histoire naturelle, de physique, de médecine, de philosophie, de morale, livres de cuisine ou de simple civilité."

Here it may be pointed out that among the oldest scientific writings in the popular French of the time, were the "lapidaire" and the "bestiaire" stories, some containing amazing episodes about precious stones and animals, the most fantastic pseudoscientific tales, and adventures that surpassed the deeds of the Knights of the Round Table. These extravagant accounts also contained statements of moral instruction mixed in with the anecdotes.

Lanson (4, p.118) observes further: "Dès le XII^e siècle aussi, le laïc ignorant pourra lire en anglo-normand la 'Consolation' de Boèce, un des ouvrages fondamentaux comme on sait, de la science scolastique, un de ces classiques que l'on expliquera, commentera dans les écoles jusqu'à la Renaissance.

On traduira plus tard l' 'Ethique' d'Aristote
Dans la langue vulgaire, comme dans la langue latine,
le XIII^e siècle est le siècle des 'Sommes' et des
'Encyclopédies': les unes plus scientifiques (entendez
le mot des sujets, non de la méthode), comme l'
'Image du monde', de Gautier de Metz, ou le fameux
'Trésor' de Brunetto Latino (1265), d'autres purement
morales et religieuses ..."

The part of the clergy and of the clerical spirit in French literature steadily increased as the bourgeoisie gained in importance and became more enlightened; as the schools, and particularly the University of Paris, organized at the beginning of the 13th century, thrust out into the world, and as it were, on to the streets, great numbers of learned men who were scholars rather than churchmen. These "clerics" brought to the world outside the convents and schools, and out of the Latin tongue, the ideas, knowledge, intellectual habits and logical methods of procedure in which they had been so carefully instructed.

The Middle Ages, however, were not informed with the true scientific spirit, except perhaps in metaphysics, in which branch of profound study they were much more daring than might be supposed.

Jean Clopinel, de Meung-sur-Loire, in his continuation of "Le Roman de la Rose" introduced a note of respect for science and of appreciation for those who possess a knowledge of it (5, p.50):

"C'est pourquoi pour noblesse avoir
Les clercs, vous le pouvez savoir,
Ont plus bel avantage et plus grand
Que n'ont les seigneurs de la terre."

Despite his bourgeois origin and violent antipathy to established traditions whether in church or state, Jean de Meung made a very notable contribution to French literature of the Middle Ages. His addition of 18,000 verses to ^{"Le} Roman de la Rose" afforded a marked contrast to the polished and courtly romance in the 4669 verses left by Guillaume de Lorris. Of him, Lanson (4, p.135) writes: "Par sa philosophie qui consiste essentiellement dans l'identité, la souveraineté de Nature et de Raison, il est le premier anneau de la chaîne qui relie Rabelais, Montaigne, Molière, à laquelle Voltaire aussi se rattache, et même à certains égards Boileau. Il ressemble surtout à Rabelais. ... Rabelais est plus puissant, plus passionné, plus pittoresque; mais en somme ce qu'il a été au XVI^e siècle, Jean de Meung le fut au XIII^e."

The second part of the "Roman de la Rose" was in reality a summary of the knowledge of the time;

an encyclopaedia of philosophy, mythology, science; an expression of the author's opinions on the universe, religion and morals. In respect to science it was a compendium of the information available to the clergy of the 13th century, including notes from the Latin authors.

Jean de Meung was an independent and bold thinker and in his writings expressed views that were to find realization in a subsequent era. His system of philosophy expressed in the second part of the "Roman de la Rose" bore little relation to theological teaching and in this respect marked a radical departure for the time in which he wrote. This fact has not passed unnoticed by other writers, for Lanson (4, p.219) says:

"Cette philosophie est tout émancipée déjà de la théologie; ce n'est pas la langue seulement, c'est la pensée qui est laïque dans ce poème ... (p.136) L'oeuvre grossière de Jean de Meung exprime ce qui va germer et grandir, elle contient l'avenir."

The Sixteenth Century

(The Renaissance)

Secularization of the arts continued and gained support in the 16th century. An awakening of artistic and scientific inclinations characterized the period. In the ninth and again in the 13th centuries there had been revivals of learning, but during the 14th and 15th centuries, though art was continued it was not enriched, and literature showed little evidence of creative writing, save possibly in the drama.

The Renaissance, and the word aptly describes the general feeling of new life and hope that marked the period, was not in reality a sudden break with the mediaevalism of the past but was rather the result of a number of favourable conditions that happened to coincide in time. The recovery of the Greek language, the stimulus created by the voyages of Columbus and Magellan, the invention of printing and the consequent more rapid and widespread acquisition of knowledge, religious and secular, literary and scientific, brought about a somewhat more naturalistic view of the universe and tended to dispel the mysticism that had dominated learning in the past.

At first the tendency was to substitute the authority of the ancients for the authority of the schoolmen but gradually more independence of thought developed. Copernicus (1473-1543) revived the heliocentric theory and showed that the accumulated mass of astronomical data could be interpreted by this means; anatomy began to be studied in the schools; Leonardo da Vinci (1452-1519) pursued his scientific way, urging the use of experiment and observation as a means to the truth, and saying to his students (1):

"Quand tu étudieras les mouvements de l'eau, souviens-toi de mettre sous chaque proposition ses applications pratiques."

and again that

"la mécanique est le paradis des sciences mathématiques; avec elle on vient à leur fruit."

Not that all of these influences had an immediate effect on French thought; at first the currents of the Renaissance in France were not well defined. Under the influence of François I and of his sister Marguerite, however, an effort was made to realize the new development of man. Later the movement became more precisely defined, as may be seen in the writings of Rabelais and Montaigne.

During the early part of the movement, men of learning, who espoused the newer knowledge, were not held in high esteem at the Sorbonne, and François I, recognizing this situation and wishing to correct it, founded, on the advice of Budé, the Collège Royal which later became the Collège de France (1529). Here learned men were brought together into a teaching faculty. At first everything in the Faculté des Arts was subordinated to scholasticism and theology.

Rabelais suggests, in his criticisms of the "sorbonigneurs" and pedants, something of the difficulties and problems of education in France during this period, but the crisis passed and toward the end of the century, the disposition in education became more favourable to the maintenance of a balance between literary and scientific studies, with some regard to physical as well as intellectual development.

It was natural that, at first, interest should be centred in humanistic studies, because the innate taste of the French people led them to accept this doctrine readily. The Italian wars in which the flower of French aristocracy took part under Charles VIII, Louis XII and later under François I, involved expeditions into Italy that brought the invaders into touch with the

literary developments in that country. France, which had been copied by Italy in earlier days, now borrowed the ideas of art, the bolder expression of thought, the elegance of architecture and the inquiring spirit of the Italians as some of the seeds that were to germinate in the Renaissance movement in France. Printing and the Reformation were also important contributing factors.

Printing made available, to many more readers than theretofore, copies of the original manuscripts of the Greek and Latin authors. A craze for the writings of antiquity accompanied this movement and to some extent, at first, overshadowed the writings of the 16th century authors.

The Reformation, carried out as an act of faith, had consequences infinitely more far reaching than its founders ever anticipated. While it did not contribute to the development of a taste for art and letters, it constituted a break with tradition and authority, it was an appeal to individual reason with which was associated the idea of liberty of thought. This in turn led to the unrestrained examination^("le libre examen") which was one element taken from the Reformation by the Renaissance movement in France. There developed a

critical spirit which, without considering the consequences of a discovery, had for its sole object the advancement of scientific knowledge, and the revelation of what its devotees conceived to be the truth.

Of this period Lanson (4, p.222) writes:

"Toutes les sciences se détachent et se constituent: histoire, philosophie, politique, agronomie, sciences naturelles; les spécialités, les écrits techniques apparaissent en Paré et Palissy. Un grand élan de curiosité porte le raisonnement et l'expérience vers la conquête de la vérité scientifique plus rigoureusement définie qu'elle ne l'a jamais été chez les anciens, parce qu'elle emprunte le caractère d'absolue rigueur de la vérité théologique à laquelle elle s'oppose."

When a language is in process of formation and when scientific studies are engaging the interest of the savants to a greater extent than has been the common practice, the opportunity for science to make an imprint on the literature of a nation is very marked indeed.

With the revival of interest in Greek and Latin writings and the increased accessibility of the original writings, made possible by printing, the

translators of classic masterpieces, which contained references to scientific work, often found the French language lacking in the precise technical words required to convey the sense of the Latin or Greek expression. In their search for an equivalent word or phrase, the savants often enriched the vocabulary either by introducing a foreign word into French usage or by adapting an existing word to meet the need.

Lanson (4, pp.277-8) finds that, all told, six methods for the enrichment of the language were advocated and practised by Du Bellay and Ronsard.

In brief, these were:

- (a) To borrow terms from the Latin or the Greek;
- (b) To compose new words boldly in imitation of Latin or Greek;
- (c) To use purely French words (adapting old or obsolete forms to new uses);
- (d) To borrow from the dialects, "principalement ceux du langage wallon et picard";
- (e) To adopt technical terms as common words in the language;
- (f) To construct new words by adding endings to existing words.

Rabelais, about whose works so much has been written, Marot and the translators, Ronsard and the Pléiade, Desportes and other littérateurs, made notable

contributions to the French language, and enriched the literature, but of these Rabelais, following in the footsteps of Jean de Meung, was the principal exponent of humanism and a great advocate of the use of the French language. His adaptation of words, his great energy and the realism, variety and volume of his writings won him a place of importance among his contemporaries in literary history. His references to scientific work and expositions of natural phenomena entitle him also to a place among the scientific writers of the 16th century.

The struggle to introduce the French language, in place of Latin, into common use as a medium for the expression of views on scientific matters, was long and arduous. With the revival of learning and imitation of the ancients, the literary and erudite writers tended to continue the use of Latin. Even Ramus, zealous and fiery adversary of scholasticism and the teachings of Aristotle, wrote almost always in Latin.

Two factors that had an important bearing on the influence exerted by the scientific writers on the French literature of this period were that, on the one hand, when the French language was employed, it

brought into literature the strength and realism, the colour and sentiment of national life; and on the other hand, that individual temperaments, not yet accustomed to the scientific method, responded slowly to these advances.

Henri Estienne (1528-98) who prepared an incomparable "Thesaurus" of the Greek language, sought steadily to prove the adaptability and flexibility of the French language. In Etienne Pasquier's "Recherches de la France", a series of dissertations on such erudite subjects as archeology, history, origin of the monarchy, language and literature, it is impossible to escape the scientific influence. His temperament and his curiosity brought him into close relationship with the scientific writers, Paré, Palissy, de Serres and others who were noted chiefly for their contributions to science but whose works nevertheless are mentioned by the recognized authorities as belonging also to the field of French literature.

Lanson (4, p.297) stresses the importance of these writers thus: "C'est parce qu'ils fournissent la naïve expression d'un tempérament personnel, et en lui, de l'universelle humanité, que Paré et Palissy

peuvent encore avoir d'autres lecteurs que les historiens de la chirurgie ou des sciences physiques et naturelles."

The influence of Palissy has come down to the present and his writings are still worth reading, perhaps more worth while than some of those of his contemporaries who dealt with political and military subjects. He wrote on subjects that are still of as much interest to-day as they were in his time: his garden, fertilizers, soils, salts, and other agricultural and mineralogical topics. Moreover, his style was simple and clear so that his writings were easy to understand. In many ways he was far in advance of his time; his observation that plants derive from the soils the elements which give them growth, and that in turn the soil must be replenished by artificial fertilization if continued crops are to be obtained, is in accord with present-day views. His love of nature gave poetic value to his writings; especially was this true in those contributions in which he introduced his sentiments on morality and domestic felicity. Probably he never thought of himself as a writer; but in his style, at once so clear and spontaneous, there was the strength of imagination

that compelled him not only to give adequate expression to his ideas but also to place them in their proper background in relation to life.

In the literature of the 16th century, Lanson (4, p.298) thinks: "La Recette véritable et les Discours admirables n'ont pas encore dans notre littérature du XVI^e siècle la place qu'ils méritent, au-dessus d'Olivier de Serres, au-dessus même d'Estienne et de Pasquier."

M. Paul Bonnefon (2,III, p.507-8) says that it was Palissy's independence of other writers that gave his language "un accent si pénétrant", and that "si Palissy a gardé dans son style quelque chose de la gaucherie du paysan, il en a la vigueur de sentiment et d'expression, qui mêle heureusement le charme du parler populaire à l'exposition scientifique et égale d'une image naturelle et plaisante la précision parfois aride du récit.

"Comme Léonard de Vinci, avec lequel il a bien des traits communs, Palissy regarde en artiste le monde qu'il analyse en savant." And the same author quotes M. Dupuy: "Cette habitude consiste à unir le mot populaire et le mot savant, comme pour les éclairer l'un par l'autre."

While the genius of Palissy was finding expression in so many ways, other workers perhaps less endowed or less forceful in character, were working with equal ardour for the advancement of science in other fields. Whereas Palissy studied nature and sought the elements of a general philosophy in the analysis of physical forces, and devoted himself especially to the study of geological change, i.e. inert matter, workers in related sciences occupied themselves with the investigation of the structure and constituent elements of living beings and sought to determine with precision the functions of the various parts. The names of some of these investigators ought to be remembered with that of Palissy because of their contribution to and influence upon the literature of the period. Not many of them, however, wrote in French; most of them still recorded their work in Latin.

An exception, and therefore worthy of note here, was Manceau Pierre Belon (1517-1564). Although Belon wrote extensively in Latin, he quite frequently expressed himself in French, and when he did so his writings, although a trifle heavy and lacking in relief, were in a style so precise and clear that his he is popularly regarded as a contributor to French literature

of this time. He wrote chiefly on comparative anatomy, but as well on the nature and kinds of fishes, a rather more important treatise on birds, and on the cultivation of wild trees. He travelled extensively throughout Europe, Asia and Egypt, and published his observations in French on his return to his native land. Perhaps his most important contribution to science was in his observations on the similarity of the spinal column in birds, fishes and man, which place him among the early students of the theory of evolution.

Ambroise Paré, a compatriot of Belon, was more popular in his time because of the superiority of his style of writing and the fact that his investigations, less speculative in character, were directed to the study of human anatomy with special reference to surgery. This was a subject of immediate public interest. Paré had never learned either Greek or Latin and so perforce, when he chose to write, he had to do so in French. His directness of style and use of popular language were in themselves attributes to his success. Apprenticed to a barber, he learned the elements of simple surgery, for barbers in the

16th century were required to pass an examination in this subject before they were allowed to practise. Paré proved an apt pupil and later went to Paris where he remained for three or four years at the Hôtel-Dieu studying and qualifying himself for work in surgery. An army surgeon for a time, he returned later to Paris where he resumed his studies and continued the practice of surgery. He was, therefore, well educated and competent to write on his subject.

Inspired by an accident to Henry II, which contemporary surgery did not know how to treat, Paré made an intensive study of the cranium and the plates of the skull and published his findings, which were based on a revision and interpretation of the older books supplemented by his own views. The book was an immediate success and went through several editions because its ideas were expressed in easily intelligible language, which was at once precise, free from pedantic terms, and fully and clearly explanatory of the subject. The troublous times in which he lived gave Paré many opportunities to demonstrate his skill as a doctor and surgeon, and his success in the treatment of notable patients brought him fame.

He found pleasure in writing accounts of the work he had accomplished and in the expression of his views on these subjects. His ten volumes of surgery were a masterpiece of the time. He, too, wrote his scientific works in a style, clear, precise, topical, pointed to the particular occasion, true and forceful. His ability to organize the subject matter on which he wrote is still admired, and the influence of Paré as a writer extended not only to the work of his colleagues in medicine and surgery but, no doubt because of his popularity, also helped to clarify and give force to the language employed by those who wrote on purely literary topics in France at this time.

One more name should be included in this brief survey of the scientific writers of the 16th century.

Agriculture, at the time of the Renaissance, had suffered inordinately. With the revival of learning and the rising sense of security that marked this period, when political and social institutions were beginning again to function normally, it was natural that the basic industry of agriculture should

receive attention. Little direction was given to this work at first, although the writings of Belon and Palissy both pointed to certain needs in agriculture.

Under Henry IV the agricultural industry received a new stimulus, for the King, who recognized the need of reconstituting the industry, sought by all convenient means to bring this end about.

Olivier de Serres (1539-1619), born at Villeneuve-de-Berg, a small gentleman farmer who had inherited a parcel of land from his father, took an unusual interest, partly from necessity, in cultivating his property and studying ways and means of making it more productive. He informed himself from the works of the ancients who had written on agricultural themes and supplemented this learning by close observation of causes and results coming within his own experience as he worked his farm.

In simple language he set down his notes and comments and when he had compiled a sufficient volume of material he published "Le Théâtre d'Agriculture et Mesnage des Champs" and dedicated it to the King.

The work was opportune. Public interest in agriculture, aroused by the increasing demands for foodstuffs and the growing assurance of freedom from foreign wars and domestic strife, at least for a time, led to a demand for authoritative information as a guide to good practice. The King himself, Bonnefon observes, used to have this book brought to him to read for half an hour each day after dinner. Eight editions in 19 years testify to the general acceptance of this treatise, of which it is said, the principles therein expounded are still regarded as the basis of sound practice in agronomy.

In his style, de Serres was unhurried and clear, pleasing and yet with a piquant note that betokened how well informed he was on this subject that was so near to his own life. A keen observer and a skilful writer, de Serres produced a work that was uniformly noble and grand. Of his style, Bonnefon (2, III, p.526) writes: "Elle est tissée d'une main experte qui sait assortir les couleurs sans relâcher les fils. Le dessin est sobre, harmonieux, vraiment pittoresque par le souci du détail ingénieux et charmant."

French prose profited by the widespread acceptance of de Serres' book as an authoritative reference that might be read not only for instruction but also for pleasure.

Critics agree that during the 14th and 15th centuries in France, popular opinion generally supported the idea that serious writing, as on science and religion, ought to be recorded in Latin. But with the advent of the 16th century, views began to change, and educated people began to consider the desirability of using their "vulgaire" as a medium for the expression of their thoughts on many subjects including politics, science and religion. There still were sceptics who doubted the capabilities of the French language for this exalted use. Before success could be attained, it was necessary to establish the validity of the French language, and this was a long slow task.

M. Ferdinand Brunot (2.III, ch.XII "La Langue au XVI^e siècle") devotes eighty pages to a discussion of this development. In it he shows clearly the influence of the several factors and traces the rise of the French language to a place of recognition among scholars, as a medium for the expression of profound thought.

Noting the attitude of the schools and the Church, both defenders of the Latin tongue, he points out that the successful use of the Italian language in the literary masterpieces produced in that country was one of the most influential factors in promoting the use of French in France to a similar end. Calvin's adoption of French and the necessity of meeting his arguments on the same ground in order to reach the same audiences was another stimulus. In 1523, Lefèvre d'Étaples published from the office of Simon de Colines, the first edition of the New Testament in French. On 10 August, 1539, an order issued by Villers-Cotterets stipulated that thenceforth the proceedings of courts should be in French, although the universities continued long after that to teach law in Latin.

Among the leaders in the movement to popularize the use of French at this time was Geoffroy Tory who operated a printing establishment and was printer to the King and to the University of Paris. In his "Champfleury" he devoted a considerable part of his manuscript to the question of using the French language in the writing of treatises on scientific subjects. His work is regarded as one of the influential

factors in promoting the adoption of French for the expression of scientific thought.

In medicine the doctors enjoyed enviable esteem, not only as practitioners but also as leaders in thought. Brunot (2,III, p.670) remarks:

"En fait, ces prétentions se justifiaient par le rôle que jouaient les médecins dans le mouvement scientifique. On peut dire qu'en France comme ailleurs, au XVI^e siècle, ils l'ont conduit; les grands savants en histoire naturelle comme en mathématiques, en physique comme en philosophie, sont des médecins. La médecine prétend à cette époque être au sommet des sciences. Elle est plus encore au centre."

This was very important because although pharmacy and surgery were, as always, closely related to medicine, these arts, or sciences, were regarded by the doctors as much inferior to medicine. On the other hand, the surgeons and barbers in the one group and the pharmacists and grocers in the other, were not as a rule versed in Latin.

With the establishment at Montpellier and also at Paris of courses for surgeons and barbers, it became necessary to give some part at least of the instruction

in French in order that it might be understood by the new arrivals. There was much opposition on the part of the Faculty of Paris, but at Montpellier, Professor Gryphis published in 1515 his "Commentary" on surgery in French, and even before that the "Guidon" of Guy de Chauliac, a great work of the Middle Ages, had appeared in French editions. Champier, in 1503, published a new "Guidon" also in French, although he was a master in the Latin tongue. An interesting anecdote about Champier, recorded by Brunot, relates that once when a Picardy surgeon who knew no Latin appeared for examination, Champier served as interpreter and advocate to such good effect that the thesis was accepted and the degree awarded.

Toward the middle of the 16th century in France, French translations of important scientific works on medicine and surgery began to appear in considerable numbers. A leader in this work was J. Canappe, doctor of medicine of Montpellier and professor of surgery at Lyons. He it was who gave the impetus to others to make the contents of Latin treatises available to those whose maternal tongue was French and who had not had the opportunity to study either Greek or Latin. The

influence of Canappe was chiefly on his professional colleagues who from that time, following his example, wrote extensively in French.

Mention has already been made of the great contributions to French literature by Paré.

In 1561, Jean de Tournes published the first French edition of the "Manuel de Dusseau", an authoritative text on pharmacy of which there had been previously only the original Latin edition.

Mathematics claimed many French, or at least bilingual texts on elementary subjects at an early date in this movement, but books on the pure science continued for a long time to appear in Latin. About the middle of the century, however, Peletier du Mans recognized that nothing would be of greater value to the French language than its use in recording the sciences where (2,III, p.689) "la vérité est manifeste, infaillible et constante."

Estienne Forçadel, who, Brunot states, dared to read in French at the Collège Royal, not only carried on his teaching in this language but wrote in French as well, translating material for his lectures from the original works of Archimedes and Euclid and from the Latin works of contemporary French writers.

A similar story can be told in astronomy and of the books on geography, both of which subjects are so closely related to navigation and exploration. In addition to the numerous French translations of Latin treatises in these branches of learning, there is one book in which Canadians have a special interest. It is an original document written in the French language by J. Cartier entitled "Brief recit de la navigation faicte es isles de Canada", Paris, 1545, (Mazarine 51757, Réserve).

Philosophy in the 16th century was much more broadly inclusive in its scope than it is to-day and embraced the study of nature in the branches now devoted to physics, chemistry, meteorology and the biological sciences. Among the writers in this class, mention has already been made of the important writings of Palissy in chemistry and geology; other names that ought to be noted include Meigret in physics, and Fr. de Fougerolles, who translated Bodin's work under the title "Théâtre de la nature", an encyclopaedia of the physical sciences.

Belon's contributions to zoology have already been discussed in reference to his activities in promoting the utility of French as an international language.

These few examples, chosen merely as typical instances, serve to illustrate how science through the writings of its devotees in all branches contributed during the 16th century to the building of the French language, by helping to popularize its use in the presentation and preservation of the results attained through research and the application of experimental methods; through the introduction of "gallicized" Latin words into the language and the adoption of old or obsolete French words to express new ideas; and in giving to the French people a sense of national pride in their language as a medium for the clear, precise and not inelegant expression of the most profound thought.

The Seventeenth Century

(Classicism)

French literature in the 17th century is usually considered in three main divisions: From 1600 to 1660, during which time, style, despite Malherbe's rules, still showed the influence of the elegant and noble qualities that marked the literature of the

preceding century; from 1660 to about 1685, the period during which, through his encouragement of the fine arts, Louis XIV helped to produce eloquence in the spoken language and richness and purity in poetry and prose; and the transition period from 1685 to 1715 that marked the approach to the changing trends of the 18th century.

A few general remarks here may serve a useful purpose as an introduction to the influence of science on the language and literature of this period.

Public taste, toward the end of the 16th century, had begun to tire of the extravagance of language that had grown up in French literature in the writings of Ronsard and his successors. The very growth of the vocabulary, the enrichment of the language, which were hailed in the 16th century as attributes to its flexibility and scope as a means of expressing thought on all subjects, brought a measure of reaction in the early part of the 17th century and found its chief advocate in Malherbe.

Although not a great genius nor a brilliant writer, Malherbe, who had begun by imitating Ronsard and the Italians, developed a strong antipathy to the imitation of the ancients and urged the purification of the French language from foreign influences, observing

crisply that in matters of the purity of language the "porters of Port-au-Foin were the masters". By this he meant not that the vocabulary of the porters should be adopted by the litterateurs but rather than in the choice of language care should be taken to select words that were of purely French quality, words that had existed in old popular speech and that had, by usage, neither a trace of the pedantry of the learned nor of the affected style that had become characteristic of the court.

There was a tendency at this time towards unity and rules. Malherbe made rules, particularly with a view to the restoration of an essentially national quality to French poetry; in fact, for the most part his influence was restrictive and negative. Nevertheless he stood for common sense, reason, current ideas and current subjects, as against fancy, imagination and symbolism, and in so doing, he prepared the way for the great writers of the classical period.

Of Balzac, the master of eloquence who sought to render prose the same sort of service that Malherbe had given poetry, it is not necessary to offer comment here, save perhaps to say that, in a sense, he was the founder of polite society and one of those who aided in

bringing about the classical period in French literature. According to his own words (4, p.389) he tried "de civiliser la doctrine en la dépaysant des collèges et la délivrant des mains des Pédants". To those who were not savants, who could read neither Latin nor Greek, he brought the substance of the writings of the ancients. He introduced the use of the commonplace expressions of cultured society to the general public and in thus popularizing the "good usage" advocated by Malherbe, rendered a distinct service to the French language and the French people.

Then in 1647 Vaugelas published his "Remarques sur la langue française" in which he summed up his observations on usage, directly following in the footsteps of Malherbe, but he took care not to try to "fix" the language; he recognized that the life of a language depends on its current utility. He sought only to lay down rules of good usage and not to limit the scope of the tongue.

The French Academy, which had been established in 1634 (charter 1637), took up the idea suggested by Chapelain and advocated by Vaugelas of preparing a dictionary, and appointed Vaugelas to direct the work.

The task was carried on after the death of Vaugelas and the Dictionary was published in 1694, thus giving permanent form to the expression of the views advocated by Vaugelas and supported by the Academy as a whole in respect to form and admissible content of the French language.

Molière and La Fontaine in their time found the Dictionary insufficient for their needs and they in turn contributed to the enrichment of the language.

Throughout the French literature of the 17th century, there is a fineness and restraint, a precise and apt choice of words, an impersonal approach to the subject, that reflects the influence of philosophical teaching of which Descartes was the master.

The "Discours de la Méthode" was the first great document on philosophical style to be written in the French language and it exerted a profound influence not only on the scholars but on the public as well, for it was read by everyone. Cartesian reason appealed to them as human reason; it applied equally to all. In its essentials it - Descartes' philosophy - consisted of a scientific conception of the universe in which reason was the sole judge of truth. It established a method of approach to truth that had a universal appeal.

While in this doctrine, science seemed to be opposed to theological truth, the religious leaders of the time recognized the force of reason and utilized the principles and teachings of Descartes to offset the dangerous reaction against theology that appeared to be a likely consequence of the new teaching.

As a matter of fact, it is probable, as Lanson has observed, that not only did Descartes by his prudence accommodate himself to theological doctrine, but he reassured the clergy by the care with which he separated the domain of reason from that of faith. Above all he was led in his method to certain verities that religion also claimed as fundamental doctrine: an infinite and perfect Deity, an immortal and immaterial soul. Thus his philosophy seemed to serve as an auxiliary to theology and to provide a rational foundation for traditional and revealed religious beliefs. Descartes himself opposed those who sought to associate philosophical teaching with irreligion. Arnauld recognized in the work of Descartes (4,p.397) "un dessein de soutenir la cause de Dieu contre les libertins".

A slavish acceptance of the Cartesian method in literature, allowing the domination of reason, would

have meant the elimination of art since the end and purpose of all thought would have been truth alone. But as Lanson (4, p.398) points out, the classic spirit showed here its agreement with cartesianism; it also made truth the supreme object of literary work, and regarded as identical both truth and literary excellence. Lanson (4, p.398) continues: "Seulement il ne pouvait sortir de pur rationalisme qu'une littérature scientifique, une sorte de positivisme littéraire, sans caractère esthétique, réduisant l'expression à la notation pour ainsi dire algébrique de l'idée: ni poésie, ni éloquence, ni forme d'art; un langage sec, abstrait, logique. En un mot, on arrive d'emblée à la littérature des Perrault, des La Motte et des Fontenelle; voilà les purs rationalistes, les cartésiens de la littérature.

"Heureusement à ce courant se mêla celui de la tradition antique, et de leur mélange résultèrent l'esprit et les oeuvres classiques. Le soin de la forme, l'idée de la beauté furent maintenus par le respect des modèles grecs ou romains: grâce à cette influence, la littérature resta un art; et l'idée d'une vérité artistique, concrète et sensible, l'idée du vrai naturel et réel se superposa à l'idée de la vérité scientifique, nécessairement abstraite."

Thus were combined the essentials of truth and beauty in the classical works of the greatest French writers of the 17th century.

Descartes, it may be recalled, began as a mathematician and soldier. It was his profound meditation on the sources of knowledge that led him to the discovery of the principles of his method and the application of algebra to geometry. That was in 1619. It was not until 1637 that he wrote his "Discours de la Méthode", which firmly established him as a leader in philosophy.

It is an arresting thought that Descartes, who, by his sheer intensity of will, was able to produce a masterpiece that marked him as a representative of his century rather than of his immediate time, should also, through the same work, have appealed to the general public as one who thought as they thought, who applied the sound doctrine of common sense to the solution of the world's vexing problems. Even his choice of the French language as the medium whereby he gave his views to the world was a mark of genius. Yet, simply, he said (2, IV, p.785): "Si j'écris en Francois, qui est la langue de mon pais, plutost qu'en Latin, qui est celle de mes Précepteurs, c'est a cause que j'espere

que ceux qui ne se servent que de leur raison naturelle toute pure jugeront mieux de mes opinions que ceux qui ne croient qu'aux livres anciens: Et pour ceux qui joignent le bon sens avec l'étude, lesquels seuls je souhaite pour mes juges, ils ne seront point, je m'asseure, si partiaux pour le Latin qu'ils refusent d'entendre mes raisons pour ce que je les explique en langue vulgaire."

Commenting on Descartes' use of French and the influence exerted by him on the French language and literature by this means, Bersot (7) says: "Nous n'aimons point ici que la science soit un mystère, et nous jugeons qu'un auteur ne s'est pas assez compris quand il n'est pas compris de quiconque est une intelligence," (2, IV, p.519), and Hannequin and Thamin, after quoting this statement add: "Pour ces motifs Descartes écrivit en français le 'Discours de la Méthode', puis le 'Traité des Passions'. En français aussi sont la plupart de ses admirables lettres. Il fit traduire enfin ses ouvrages latins, les 'Méditations' et les 'Principes', et revit les traductions. Il est un des fondateurs de la langue philosophique et scientifique en France. Par cette initiative il a répandu, sans être un vulgarisateur, le goût de la science et de la philosophie."

While the influence of Descartes was great and widespread, his contemporaries were less profoundly affected by his teaching than were those who followed him. Des Granges expressed this idea when he observes (3, p.311) that Descartes in a sense "represents and centralizes a whole movement which began with him." The "Messieurs de Port Royal", Bossuet, Fénelon, Malebranch were all, in a sense, Cartesians, and Brunetière (6) supports the thesis that the "Encyclopaedists" continued the system developed by Descartes.

It is possible, as Des Granges (3, p.311) suggests, that the great writers of the 17th century might have "loved reason, truth, psychology and general ideas, and have observed in their works that order which is one of the essential characteristics of the classical style", but it is also true that when a general tendency finds expression in the work of a genius, the movement is regularized and given direction and force. Racine's well ordered phrases show the influence of Descartes; Boileau probably owed in part the distinctness and clarity of his writing to the influence of Descartes, and Bossuet's sermons ring with the common sense that was fundamental in Descartes' teaching.

Nevertheless, although Descartes made a great contribution to French literature and exercised a far-reaching influence on the scientific thought of his time, it is not sound criticism to suggest that without him, the great classical writers of the period would not have created their masterpieces. The roots of literary taste existed before the philosophy of Descartes was announced, but as it often happens, there was moulded in the hands of this master philosopher a generalized conception that crystallized rather than determined the views of the savants in language that everyone accepted as his own. In the expression of these views, too, he gave them added strength, brought out clearly ideas that had been obscured in confused thought, and collected and systematized them so that the completed work bore the stamp of simplicity that is only attainable by genius.

Herein is to be found the significance of Descartes' philosophy and literary works: they were the first to give expression to a great tendency in national thought, that found almost universal acceptance.

As a measure of man's greatness in intellectual achievement, it may well be that the ability to express

simply, clearly and in a convincing manner the elements of some great truth that scholars seek is "more to be desired than rubies". This was the contribution that Descartes made in his time; his influence became more apparent as the century moved on.

What finer summation would one desire than is found in the famous passage in the preface to the "Principes" (2, IV, p.512): "Toute la philosophie est comme un arbre dont les racines sont la métaphysique, le tronc est la physique et les branches qui sortent de ce tronc sont toutes les autres sciences qui se réduisent à trois principales, à savoir: la médecine, la mécanique et la morale; j'entends la plus haute et la plus parfaite morale, qui, présupposant une entière connaissance des autres sciences, est le dernier degré de la sagesse."

From about 1600 onward, a very considerable number of books on medicine, were published in French following the issuance of a treatise by Marin Cureau de la Chambre, entitled "Nouvelles conjectures sur la Digestion" in 1636. This doctor, who had become an academician, wrote a striking preface to his book

in which he declared the time had come to abandon Latin as a scientific language and to use French exclusively. He was not a great writer and his arguments lacked strength and style, but the idea caught the fancy of the other writers on medical subjects and the use of French in medical treatises increased accordingly.

Perhaps one reason for the stimulus was that a lawyer named Belot, who considered that the "Preface" was directed at him as the "anonymous reader", took occasion to refute the statements of the "Preface". He argued that science should be kept hidden from the public since a knowledge of it would lead in religion to heresy, in philosophy to sophistication, in politics to insurrection and decadence, in medicine to empiricism. Nor was he entirely alone in this view, for it may be recalled that Michelet remarked (2, IV, p. 537) "Qui a fait la Révolution française? --- Descartes."

Provision was made for the teaching in French of all the sciences, in fact of all the subjects of instruction save theology, in the Collège royal which the King authorized Sieur Legras to establish in 1640. In the King's Declaration it

was pointed out that in establishing the college for instruction in and by means of the French language, he was following the example of the most illustrious ancient nations who had taught science and the arts in their own natural language.

This action sought to broaden public knowledge on scientific matters and as this idea spread, the extent of the influence of scientific teaching widened to be reflected in references, illustrations and allusions to science in purely literary works. In this way science was afforded a further opportunity to serve French literature through the enrichment of the popular vocabulary, not only by the addition of new words but also by providing striking illustrations and promoting the desire for precision and accuracy in speech and the written word.

Mathematics has always been associated with clear thinking and exactness in expression. In the 17th century Descartes and Pascal were outstanding among their colleagues, first in mathematics, later, the one in philosophy, the other in letters and religion.

Pascal's genius for science and especially for mathematics showed itself at an early age. At twelve he had read six books of Euclid and at sixteen he wrote a "Treatise on conic sections". He invented a mechanical device for making arithmetical calculations, in order to assist his father, who was Intendant at Rouen, in keeping the numerous books required of his office. The modern calculating machine is not radically different from that devised by Pascal.

When Blaise Pascal was 23, his father suffered a broken hip and for three months was attended by two neighbouring noblemen, who practised surgery for charity. These men were Jansenists and under their influence Blaise Pascal, his two sisters and his father became fervent Jansenists. The family had always been devout but now became austere and rigorous in their religious observances. From that time forward the young Pascal inclined more and more to literary and religious labours; ten years later he came to the defence of Arnauld of Port Royal and then published his "Provinciales", which Voltaire later described as "the first book of genius written in French prose".

Pascal, following in the footsteps of Calvin, brought theology to the people in much the same way as Descartes had brought them philosophy.

Always a sound and clear thinker, Pascal had a marvellous imagination and a gift for literary style that placed his writings in the front rank for their lyric quality and unassuming naturalness, qualities attainable only through profound meditation and a true knowledge of psychological science.

Commenting on Pascal's art of persuading, Des Granges (3, p.377) points out that it rests essentially on the distinction between the spirit of geometry (the deductive reasoning of the savant) and the spirit of finesse (the instinctive or intuitive perception of those reasons which will persuade others). The orator must divine what reasons will convince his adversary, and the order in which they should be presented. The order, so difficult-so difficult to grasp, cannot be indicated by rule; it is the mind in each case which creates and follows it. Writers often slavishly follow rules of order, and when they do their work shows it.

Of Pascal, it has been said that there is no French writer whose work carries less imprint of

the author. Yet his style, at once so limpid and so clear, was often attained only after great labour. It is said he rewrote the eighteenth "Provinciale" thirteen times before allowing it to go to press.

If one may judge the literary importance of the "Provinciales" by the repeated references to them in the works of those who have attained lasting fame in French literature, these pamphlets of Pascal, the mathematician and physicist, served so well to co-ordinate and, to the satisfaction of all, to establish "good usage", that they were immediately and are still regarded, to quote Gazier (2, IV, p.602) as: "une de ces oeuvres qui influent sur les destinées littéraires d'une nation." The same author observes: "Aussi le succès de cette publication ne fut-il point éphémère; quinze ans plus tard, Bossuet en louait la 'force' et la 'délicatesse'; quarante ans après leur apparition, il exhortait ironiquement Fénelon à ramener s'il en était capable, 'les graces' des 'Provinciales'. Voltaire, si prévenu contre Pascal, les comparait sans hésiter aux meilleures comédies de Molière et aux plus beaux discours de Bossuet."

The "Provinciales" in 1656, appeared at exactly the right psychological moment to obtain their greatest effect on the language. Twenty years after

"Le Cid" and the "Discours de la Méthode", summing up the best judgements of the Academy during that time, and following the preparatory period in which the public had come to appreciate the significance of speaking according to the Dictionary, or "parler Vaugelas", the "Provinciales" did a great deal to stabilize and standardize the best the language could afford.

The "Provinciales" of course were not treatises on science but they were the product of a brilliant mind trained in the intricacies of mathematics and physics, and it seems reasonable to say that science has the right to claim them as evidence that the influence of science and scientific method on literature, at least in the hands of such geniuses as Pascal, can be highly beneficial.

Toward the end of the 17th century a disagreement arose among French writers as to the function, place and importance of the ancient classical writers in comparison with those of their own day who, by assiduous attention to the rules of form, and the methods of composition and style followed in the models of antiquity, had themselves attained the ability to create literature that in the minds of some was superior to the best produced in ancient Greece and Rome.

Classical writings in this period were the product of two forces: rationalism and the aesthetic taste exemplified in the writings of the ancients. Rationalism tended to draw away from antiquity and to make the modern writers self-sufficient in their work. Those who regarded the writings of the ancients as the world's best models were on the contrary continually attracted to them. Most of the great works of the period, moreover, had been produced by those who kept the Greek and Roman writers as their ideals, both in subject matter and in style.

But rationalism had seized the public fancy. The spread of learning, the independence in religious thought that marked the period, and above all the progress in scientific discovery, gave rise to the idea that similar progress should be made in literature. A feeling of superiority brought the more outspoken members of the literary world to declare that leading writers of their time were better than the ancients. It seemed to them impossible that current moral attainments, the result of Christianity, should not be accompanied by a corresponding movement in literary excellence. The quarrel then was, at least in part, traceable to scientific development, to the spirit of

independence and self reliance that grew out of the advances in experimental science and the philosophical teaching of Descartes.

It is not necessary here to describe the quarrel, but merely to note its consequences. The moderns won. The salons supported Perrault who had started the quarrel by reading a communication to the Academy in which he compared the works of modern French writers with those of the ancients and claimed that the age of Corneille, Molière and Racine was as valuable in quality and productivity as those of Pericles or Augustus. The effect of the victory was largely to free modern literature from respect for or restraint by, the writings of antiquity.

By this step, there was virtually removed from French literature, at least for a long time, the influence of the art which had been the moving spirit in the poetry and eloquence of the 17th century.

Here perhaps, the influence of science tended in a measure to offset the benefits which had accrued to the language in an earlier period, when French was in process of formation and science was able to enrich and embellish the vocabulary and phrasing.

The Eighteenth Century

(The Encyclopaedists)

While the 17th century in France had been splendidly and profoundly Christian in its outlook, and monarchical in its taste, many factors contributed to render the characteristics of the 18th century distinctly different. In fact it is perhaps nearer the truth to say that the 18th century was antichristian, destructive of traditional beliefs, and opposed to constituted authority.

Philosophy in the 17th century had meant systems of metaphysics, psychology or ethics, and later, logic; experimental science in the 18th century expanded the general view and changed and widened the concept.

In religion, the Church, weakened by the recurring disputes of the 17th century, lost some of its authority; the dull devotion of the later years of Louis XIV's reign gave way to hypocrisy and impiety. Moral science became detached from theology and science substituted for religion in explaining to man his origin, nature and future. Sense and sensation, the conception of man primarily as an animal, and consideration of his relation to his surroundings gradually drew the rationalists away from the abstract conceptions of the earlier period.

Literature, which had been nurtured by church and state, did not break suddenly with its previous associations, but, lacking the support which Louis XIV had given its devotees, it lost much of the essentially psychological character which had marked its progress during the 16th and 17th centuries; it developed apart from royalty, and became responsive to public opinion rather than to the dictates of the court. Subjects of broad interest - the world, life, man - disappeared; the rich, diffuse language of the 16th century was replaced by the clear, regular and exact diction of philosophy. The nobles no longer patronized scholars; they themselves practised the fine arts and the sciences.

In the salons, the language of the "précieux" yielded slowly under the increasing pressure of opinion and in the homes of Mme de Tencin, Mme de Deffand and Mme Geoffrin, discussions on philosophical subjects excited the keenest interest. "A stream of bold curiosity and sceptical philosophy, whose source sprang from the Renaissance, seemed, in Saint-Beuve's phrase, to have disappeared under the earth during the 17th century to reappear in the 18th." (3, p.552). Literature in the 18th century thus took a direction

quite contrary to that which it had followed in the preceding epoch; in this change neither revelation nor experience guided it.

The period was fruitful in scientific discoveries: in mathematics, d'Alembert and Laplace; in astronomy, Herschell, Clairaut and Cassini belonged to this time; in physics and chemistry, Lavoisier, Berthollet and Fourcroy vied with Franklin and Priestly; in the natural sciences, Buffon was one of the many to attain distinction. In this movement the nobility and the women joined; Mme de Châtelet translated Newton's works and sent memoirs to the Academy of Sciences.

It became popular and fashionable to be a physician or a chemist, as formerly it had been to be a wit. The progress of science had a far-reaching and pronounced effect on the thinking of the time; it helped to bring about a reaction against the somewhat utopian ideas that had been allowed to develop in philosophy, although the results of this influence were more apparent in the 19th than in the 18th century.

Mathematics, at the beginning of the 18th century, was incomparably further advanced than were the natural and physical sciences, and when the wave of popularity turned the attention of educated people

towards science, mathematics was the first to give direction to the seekers' thoughts. Hence as Lanson points out (4, p.620):

"On ne s'attacha qu'à simplifier, abstraire, analyser, généraliser, déduire. On élimina partout le réel et le concret, et l'on n'opéra que sur des idées."

This movement, translated into the realm of literature, made it impossible for the classical tradition to continue. Perrault's arguments had won acceptance. The teaching of the classics became a cultural function of the Jesuit schools but in the matter of models, current writers contented themselves with imitating the better writers of the 17th century.

Fontenelle was one of a group, which included La Motte, Bayle, and l'abbé de Saint-Pierre, who formed a liaison between the major periods of the 17th and the 18th centuries. Seeing more clearly than Perrault the significance underlying the quarrel between the ancients and the moderns, Fontenelle distinguished between the sciences which take time to perfect, and the arts in which perfection can often be almost immediately attained. He recognized that there was nothing inconsistent in the idea of progress on the one hand and the stability

of the laws of nature on the other. Picking up the idea from the works of Descartes and developing it in the image used by Pascal in his "Fragment d'un traité du vide", Fontenelle said (2, VI, p.7):

"Toute la question de la prééminence entre les anciens et les modernes étant une fois bien entendue se réduit à savoir si les arbres qui étaient autrefois dans nos campagnes étaient plus grands que ceux d'aujourd'hui .. La nature a entre les mains une certaine pâte qui est toujours la même."

Fontenelle saw that it was necessary to distinguish between science and letters in considering the relative merits of the ancients and moderns, and pleaded for recognition of the fact that where the ancients had shown excellence the truth should be admitted, but he held that such an admission did not mean that their works could never be equalled.

With this background of Fontenelle, more direct consideration may be given to the significance of his work in the field of science.

As author of "Entretiens sur la pluralité des mondes" (1686), and more particularly in his "Eloges des savants", and "Eloges des académiciens" (1708-19), this nephew of Corneille, who became permanent secretary of the Academy of Sciences, wrote brilliantly, although at

first sight superficially, of the learned works of Tournefort, Leibnitz, Newton, Du Fay, Montmort, de Cassini.

Fontenelle was an innovator in the field of popular science. He was always exact and clear, and he had the faculty of being able to make abstruse scientific problems seem simple and easily intelligible. In opening up this domain of literature, Fontenelle made a distinct contribution to French literature and prepared the general public as well as the workers in related sciences, for the more technical works of Buffon that were to appear later.

As he grew older, his writing steadily improved, and although he himself never made any great scientific discoveries, he fully understood and clearly demonstrated the utility of the speculations made by his colleagues in the mathematical sciences. His ingenuity and profundity of thought are indicated in an observation quoted by M. Pierre Robert (2, VI, p.12):

"Jusqu'à présent l'Académie ne prend la nature que par petites parcelles. Le temps viendra peut-être que l'on joindra en un corps régulier ces membres épars, et, s'ils sont tels que l'on le souhaite, ils s'assembleront en quelque sorte eux-mêmes."

and M. Robert adds:

"Ne peut-on pas voir dans cette espérance de Fontenelle l'idée de la solidarité des sciences?"

Fontenelle deserves a place apart; he was an intermediary between the obscurities of science and the ignorance of the general public, between the world, the realm of letters and the domain of the natural sciences. He not only brought the secrets of science out into the light of everyday knowledge; he enabled the public to make the acquaintance of the learned savants and in so doing increased the respect of the people not only for the work but also for the workers in this intellectual field.

Pierre Bayle (1647-1706) and La Motte-Houdard (1672-1731) were other members of the liaison between the 17th and 18th centuries, but their interests were chiefly in philosophy and criticism. Bayle, in his writings and in his "Dictionary" - which he said he undertook in order to fill the gaps left by previous dictionaries - seldom or never made open and direct attacks on the subjects which excited his criticism, but by a clever system of references from one article to another, he introduced the method that was followed later by the Encyclopaedists, a method that enabled him to attack effectively the dogma and authority he disliked.

He gathered and disseminated the free-thinking views of the 16th and 17th centuries and, accepting no authority, applied only the historical method in all his work.

La Motte-Houdard is remembered mainly for his share in the quarrel of the ancients and moderns.

Abbé de Saint Pierre (1658-1743) was an advocate of public utilities and in his works was a forerunner not only of the 18th but even of the 20th century, for in his writings are found the germs of modern economic science. He is credited with inventing the word "bienfaisance"; this and the word "progress" serve to characterize the chief objects of his mind and works. For him there were only two categories of writers: those who wrote or spoke at length without proving anything; those who never spoke without proving their point. He himself belonged in the latter group.

These four bridged the span between the principal periods in the literature of the 17th and the 18th centuries.

A study of French literature in the 18th century reveals a rather sharp line of demarcation between that which appeared prior to 1750 and the writings of the ensuing forty years. Montesquieu and Voltaire stand out as the leaders in the earlier part of the century,

when criticism of established institutions was moderately voiced; Diderot, Rousseau and again Voltaire led the campaign in the second period when the action was much more general. In the end, when the forces of reason had won general acceptance of their ideas, there was a partial reversion of sentiment which permitted the infiltration into the literature of the time of references to nature and notes of imaginative quality that tended to restore something of the lyric quality of an earlier period.

Montesquieu in his "Lettres Persanes", a witty and yet profound satire of society and institutions, devoted the 45th chapter to "The Alchemist". Writing in French and thus following Fontenelle, Montesquieu was among the first to treat the science of chemistry in a popular way. In order to make himself easily and clearly understood by the general public, he divided his subject matter into small sections, to each of which he gave a piquant title, and he concentrated his reasoning into short, vivid interrogative sentences that seized the attention and aroused the curiosity and interest of his readers.

Montesquieu was a magistrate and prominent in the institutions of the country, and for this reason, perhaps, much of the lighter part of his writing

was the more readily accepted by the masses as highly amusing and entertaining literature. Nevertheless he rendered some service to science in promoting popular appreciation of it. His work erected also one further barrier to the use of Latin in recording scientific endeavour in France.

Voltaire, a recognized leader in French literature during this period, was not particularly influential as a scientific writer. He was, nevertheless, the first to undertake the preparation of what might be called to-day a history of civilization. Choosing as his theme "Le siècle de Louis XIV" he collected an infinity of detail on which he based what Des Granges has described as "a history of men's minds during the most enlightened of all ages." In this voluminous compendium he found a place for a record of the development in the sciences. Not only in this chapter but in the work as a whole, Voltaire did much to influence the writing of history, both in his own time and since. His respect for sources, his ardour in seeking documents and his skill in organizing and presenting the assembled material deserve mention.

The greatest literary accomplishment of the 18th century in France was the publication of "The Encyclopaedia" which was completed in 1772. It consisted of 17 volumes of text, 4 supplementary volumes and 11 volumes of plates.

In 1727, Chambers in London had published an Encyclopaedia, and in 1743 an Englishman named Mills and a German, Sellius approached Le Breton, a Paris publisher, with the suggestion that they be commissioned to make a French translation of Chambers' work. For half a century, dictionaries of various kinds had been popular in France, but most of these had dealt with subjects of common interest rather than with technical and scientific matters. The idea of producing a comprehensive reference of this kind in the French language, therefore, appealed to the publisher. On examination of Chambers' Encyclopaedia, however, he found that much of the material in it was already out of date and he decided that it would be more worth while to prepare another, and entirely new, publication.

In 1750 Diderot issued a prospectus explaining the objects of the work and outlining the terms of subscription, and in the following year d'Alembert, the other principal editor, published the "Discours

préliminaire" in which he surveyed the progress of the human mind, and, more important from the point of view of this discussion, prepared the first general classification of sciences that had appeared in the French language.

It is not necessary here to trace the progress and besetting problems of the Encyclopaedia during the twenty-two years of its preparation, but only to note its influence on literary and scientific thought.

A suggestion has already been made in reference to the work of Bayle regarding the successful method adopted by the authors of the "Encyclopaedia". Individual articles in it were all prepared with great care and when controversial subjects were discussed, the practice of the authors was to present a complete and satisfying account expressing the views of one group and then, in another place, to print an article, equally inoffensive in itself, but which served adequately to refute the views expressed in the first article. Thus the "Encyclopaedia", to be fully understood, must be judged as a whole rather than on the merits or defects of selected articles.

Underlying all of the work thus recorded by Diderot and d'Alembert, is an absolute confidence in human

progress toward ideal conditions in respect to politics and individual liberty, a denial of authority as such, a refutation of faith and a positive belief in the realistic things of life that can be seen or touched or made.

The "Encyclopaedia" reached almost every home in France and its influence on popular opinion and hence on literature of the time was very great indeed. In respect to science in particular, it created a widespread appreciation of its applications to everyday life. It hastened, too, the approach of certain social reforms, and to some extent encouraged curiosity and exactness of expression.

Mention must be made of here of d'Alembert, the mathematician, who edited and revised all the articles on mathematics in the "Encyclopaedia", and of Diderot, who served as chief editor and wrote extensively on history, philosophy and especially the applied sciences.

D'Alembert became a member of the Academy of Sciences at the age of 26 and of the French Academy at 37. Possessed of a charming manner and an excellent education, he was welcomed at all the salons; he was the chief representative of the philosophers of his time. Severe in his manner, he attained a very considerable measure

of prestige through his insistence on respect for the three virtues: "liberté, vérité, pauvreté". Moreover he practised them himself. His collaboration in the "Encyclopaedia" afforded him an excellent opportunity to make use of his high academic attainments, scientific training, and social position. It was through his contributions to the "Encyclopaedia" rather than by his philosophical and mathematical treatises that he exercised his greatest influence on the literature of his time.

Diderot was an impetuous and voluminous writer on almost every topic. In physical and mental vigour it is probable he was not surpassed by any of the writers of his time. His enthusiasm was remarkable and only matched by his untiring industry. His carefree nature got him into and out of difficult situations and despite his occasional follies, enabled him to win and retain the esteem of his colleagues. In his scientific work he built models to demonstrate difficult problems in mechanics or to furnish illustrations for the "Encyclopaedia" to which he gave his best efforts, superintending everything, choosing collaborators, writing much of the material himself and doing absolutely everything in his power to make it a success.

Scientific influence arising from the "Encyclopaedia" extended throughout France and made itself felt for a considerable time. A school of writers developed concurrently with the preparation of the "Encyclopaedia", particularly in the later years. Raynal published, in 1772, his "Histoire philosophique des établissements et du commerce des européens dans les deux Mondes"; Volney contributed "les Ruines" in 1791, a commentary on the philosophy of the "Encyclopaedia"; and Condorcet in 1793 wrote the plan of a great work in support of the idea found in the "Encyclopaedia", that humanity is susceptible of indefinite progress; he entitled his treatise "l'Esquisse d'un tableau historique des progrès de l'esprit humain."

Many writers contributed to the "Encyclopaedia", and often with little or no pay; the series of volumes had a great sale and the venture was a commercial success. As a result of the wide distribution of copies, its opportunity to influence the literature of the time was considerable; it is not improbable that its effect in this way was commensurate with the profits obtained from the enterprise.

Buffon, botanist, lover of nature, and author of important scientific works, was a man who possessed in the highest degree the scientific imagination which is like the poet's and who, as Des Granges says (3, p.618), may "rightly be compared with Pascal and Lucretius". His contribution to the literature of science was not unlike that made by Descartes to philosophy. In fact, Hénon, writing of Buffon's work, says (2, VI, p.208): "L'orgueil de la raison humaine n'a jamais été porté plus haute."

Author of "L'Histoire Naturelle", of which 36 volumes appeared at intervals between 1749 and 1789, Buffon was a great naturalist who seemed scarcely to belong to his own but to a later time. It is probable that his intense interest in nature was stimulated by his appointment as superintendent of the "Jardin du Roi", now the "Jardin des Plantes", in Paris. Here he was afforded many opportunities to obtain information on botanical and other scientific matters and also by reason of his high position was enabled to gain access to documents and specimens that would not otherwise have been made available to him.

His "Histoire Naturelle" was an instant success and went through numerous editions. In it he began with the theory of the earth's formation and dealt with successive stages. Aided by a powerful imagination and informed through unremitting toil, Buffon succeeded in creating a complete theory of the evolution

and progress of the world. When he came to consider man, he argued that the chain of evolution had been interrupted, and as he developed his ideas of the Deity, he set himself apart from the materialists and sceptics of his day. A feature of this work was the series of magnificent "portraits" of animals.

His treatment of minerals, in which he was assisted by Abbé Bexon, and of birds with the help of Gueneau de Montbéliard, were both masterly.

Of his own methods and principles he said (2. VI. p.225):

"C'est par des expériences fines, raisonnées et suivies, que l'on force la nature à découvrir son secret; toutes les autres méthodes n'ont jamais réussi. Les recueils d'expériences et d'observations sont donc les seuls livres qui puissent augmenter nos connaissances."

In 1753 he published "Discours sur le style", as an address to the members of the French Academy who had honoured him by election, without application, to that august body. This was the first instance on record of such an election. His theory of style, while somewhat lacking in present-day value, was admirably suited to the conditions of his time and hence was received with acclaim.

Of his writing, M. Félix Hémon (2. VI. pp.248-9)

says:

"Ce n'était ni le style court et vif de Voltaire, style d'homme d'action, bon pour la lutte présente, insuffisant pour graver des pensées; ni le style oratoire, mais trop individuel et attendri de Rousseau, style de réveur qui s'exalte dans sa rêverie. Voltaire, c'est la raison trop rarement éloquente; Rousseau, c'est l'éloquence trop rarement soutenu par la raison. Venu après Voltaire et avant Rousseau, plus philosophe et plus orateur que l'un, moins douloureusement sensible que l'autre, dont il plaignait les malheurs, s'étant placé de bonne heure en face de la nature, qui lui donnait une leçon quotidienne de sérénité, il a traité les choses de la nature avec un tout autre ton qu'on ne traite une querelle ou une question personnelle, avec suite, avec calme, avec autorité."

Buffon's greatest merit as a writer was that he brought the natural sciences into the domain of literature as Pascal had, theology. He counselled those who had to write for instructional purposes on theories or discoveries to set forth their views simply and clearly in order that their ideas might be made readily accessible to the great company of readers.

This is the dominating note that makes itself heard in the expressed views of all the great scientific writers whose works have been considered in this study.

André Chénier deserves mention with Buffon since his work has been described as that of "Buffon in verse". In his great didactic poem "Hermes" he undertook to portray the formation and history of the world and devoted one canto in particular to a history of scientific and philosophical civilization and the theory of progress. The chief merit of his poetry was that in it were to be found those picturesque qualities that marked a return to something of the romantic and sentimental features characteristic of the poetry of the 16th and 17th centuries but which were noticeably lacking in the poems of the 18th century. Chénier's work then, marked a reaction against the effects produced by the scientific influences that had dominated this period.

A defect in the literature of the 18th century became apparent after 1750 and pronounced by 1760. The notion of literature had gradually changed until it had become no longer a means for the expression of beauty in language, but rather the art of informing the world in the precise language of the scientist. Instruction tended to be considered of greater importance than the idea of giving pleasure to the reader. Brunetière emphasizes this development when he says (8, III, p.323):

"A mesure que la littérature telle que l'avaient conçue Boileau, Racine, La Fontaine, Regnard même et Le Sage, c'est-à-dire la peinture objective et l'impersonnelle représentation de la vie, perd du terrain et cède la place, elle perd aussi des moyens; la vie se retire insensiblement d'elle et avec la vie cette sympathie qui lui est nécessaire, la complicité de l'opinion, et la faveur du goût public; il n'en subsiste que des formes vides, qui ressemblent à des parodies ou à des caricatures des grands modèles."

And Emile Faguet is quoted by Cherel (9,p.445):

"la prose large, étoffée, nombreuse et harmonieuse, au beau développement et aux souples évolutions des grands maîtres en style du XVII^e siècle, avait, peu à peu, et même assez brusquement, sans qu'on puisse en voir très nettement les causes, succédé une prose fort distinguée aussi, mais d'un genre essentiellement différent; un style coupé, court, nerveux plutôt que fort, procédant par phrases brèves, vives et comme tranchantes, par traits, par maximes et par épigrammes."

But if literature had lost quality, science had gained recognition and from this time forward the sciences, mathematical, physical and natural, were truly in their own domain. They had gained complete autonomy

in their respective fields, had defined their particular functions and drawn the delimiting lines; religion, philosophy and history were for the first time excluded from consideration. Science came to be regarded as worthy of study for its own sake and quite apart from other branches of learning.

Brunetière supports this view (8, III, p.332):

"Changement d'orientation en littérature, dissolution morale, formation d'un certain concept de la science, tels sont les trois phénomènes très apparents à la fin de la première moitié du XVIII^e siècle."

Shortly after the middle of the century a new movement took form in which Mirabeau and Quesnay were the leaders. A book by Mirabeau entitled "Ami des hommes ou Traité de la population" attracted the attention and interest of Quesnay, a doctor of Versailles, and one of the collaborators in the "Encyclopaedia". They founded a group of "Economists" which counted Dupont de Nemours, Mercier de la Rivière, l'abbé Beaudeau, Turgot and Letrosne among its principal representatives. Their activities brought a measure of reaction against the doctrines of the "Encyclopaedia", because, as Brunetière puts it (8, p.424-5):

"Ils croient qu'il y a des lois naturelles qui gouvernent l'individu; que la science par excellence a

pour objet de dégager ces lois du milieu des obscurités qui nous en cachent la vue; que le bonheur de l'humanité ne consiste qu'à suivre ces lois."

Again he says (8, p.426-7):

"Les Encyclopédistes sont des à-prioristes, rationalistes, philosophes; les Economistes sont des empiricistes, utilitaristes. ... les premiers partent de la considération de ce qui devrait être, les seconds de la considération de ce qui est."

Jean-Jacques Rousseau who attained immediate and lasting fame by his "Discours sur les sciences et les arts" was one of those who turned from the philosophy of the "Encyclopaedia" to that "reasoning of the heart that reason itself does not know." Pursuing this theme throughout his work, he restored a personal quality to literature and in so doing established his claim to be the "ancestor of the romanticists" of a later era. His writings embraced a wide field of subjects in all of which he sought the return of man to the simple rules of life; the lyric qualities of his works were a source of inspiration to his followers in the 19th century.

Commenting on the eloquence and style of his works, Brunetière observes (8, III, p.521):

"Pour exprimer ces idées, Rousseau a trouvé une langue unique, dont assurément quelques parties ont vieilli, mais qui était et reste encore neuve et hardie, familière et forte, sonore et cadencée, et où la sincérité de l'accent a renouvelé tous les procédés de la rhétorique. Elle est ainsi sinon la plus pure, du moins la plus belle que l'on ait parlée depuis Bossuet et depuis Pascal. On l'appelle déclamateur. Il n'est que sophiste, et excellent, et passionné orateur."

Bernadin de Saint-Pierre, a follower of Rousseau, wrote with somewhat greater variety but with less strength and as he was a lover of nature, his works reflected this trait. He was for a time in charge of the "Jardin des Plantes", and it is not difficult to believe that he found this work a pleasure to perform.

As a writer he followed Rousseau closely, but as Lanson points out (4, p.815): il lui tient par tout ce qui séparait Rousseau de Voltaire et de l'école classique, par tout ce qui faisait de Rousseau l'ancêtre du romantisme."

Cuvier, famous as one of the founders of paleontology and for his writings on comparative anatomy, lived towards the end of the 18th century and into the 19th century. In respect to his influence on literature,

other than through the somewhat grandiose style of his scientific writings, it may be noted that in replying to the discourse delivered by Lamartine on the occasion of his election to the French Academy, Cuvier made a definitive analysis of the poetry of the "Meditations".

Ampère, whose name has come down to the present in electrical terminology, is remembered for his admirable scientific works revealing an "exquisite sensibility" and a "freshness and sincerity that offer a restful contrast to many purely literary letters."

Others could be noted but possibly sufficient examples and illustrations have been given to indicate the nature and the extent of the influence exerted by scientific writers - or science - in the literature of France during the period under study.

That science exerted a considerable influence on the French language and that by the end of the 18th century, French had attained prestige as a "universal language", are attested by many writers both in France and in other countries. The following quotation is typical of the kind of references found on this subject. Speaking of the attainments of the French language in the 18th century, M. Ferdinand Brunot^{writes} (2, VI, p.820):

"En outre, le mouvement scientifique et philosophique eut pour effet non seulement d'augmenter le lexique scientifique, mais de mêler ce vocabulaire spécial à l'autre, et la presse périodique rendant familiers à tous des termes jusque-là réservés à un petit nombre d'initiés, le caractère de la langue écrite, et bientôt de la langue parlée, s'en trouva bien changé. ... Au XVIII^e siècle, notre langue acquiert une situation à part dans l'estime du monde, situation qu'aucune langue vivante, même l'italien au XVI^e siècle, n'avait jamais possédée. Vivante, elle monte au rang que seules les langues mortes avaient tenu, de langue internationale de la culture et de la société."

No attempt has been made to appraise the history of French literature of this period or even to list the most important names. The purpose has been to assess the intellectual and literary influence of certain writers, chiefly from the field of science, who contributed in some measure, large or small, to the changes brought about in the French literature of the seven centuries under review.

Summary

A general examination has been made of French literature from the Middle Ages to the nineteenth century, with special reference to the works of the scientific writers.

Evidence has been adduced, in the form of quotations from the French texts of more than one hundred recognized authorities, to support and illustrate the views expressed in regard to the influence of science on French literature.

Attention has been directed to the particular contributions made to French literature by each of the principal scientific writers in the period under review. Among the sciences to which reference has been made are: agriculture, archaeology, astronomy, biology, botany, chemistry, economics, entomology, geography, geology, mechanics, medicine and surgery, mineralogy, ornithology, palaeontology, pharmacy, philosophy and physics.

It has been shown that those scientific writers, throughout the ages, whose works have won them a place in the standard reference books on the history of French literature, were invariably among the leaders in the thought of their time, were the geniuses whose vision carried the nation forward in each era.

Credit has been given to the clergy for their part in preserving the culture and scientific knowledge of antiquity through the Dark Ages and in promoting the spread of mathematics, astronomy and the natural sciences in the later Middle Ages.

Tribute has been paid to the translators, who introduced the subject matter of Greek and Latin masterpieces, including scientific treatises, into the French language, and who in their search for equivalent expressions often enriched and embellished the French vocabulary by "gallicizing" classic terms, coining new words, reviving obsolete forms and giving them modern meanings, and adapting expressions from the 'provincial' dialects to current national use.

In a comprehensive review of the developments leading to the adoption of French instead of Latin as the language of learning, in France, it has been demonstrated that the scientific writers were among the principal proponents of the use of French.

It has been shown further that in advocating and applying the use of the French language in France, the scientists did much to popularize the tongue and to blend into the French vocabulary many technical words and new

expressions that added to its value as a medium for the clear and precise expression of thought - qualities that helped the French language to win the widespread international use it enjoys to-day.

While emphasis has been placed on the beneficial effects of science on French literature, the few adverse effects have been noted and discussed, and the extent of their influence has been appraised.

Conclusion

In the Middle Ages, and more especially in the 16th century, the rise of the natural sciences had a profound and far-reaching effect on French literature through the adoption of French to the exclusion of Latin as a medium for the expression of thought on scientific matters.

In the early 17th century the influence of science was less clearly defined, but from the time of Descartes and Pascal the use of French became general, not only in writings on the physical and biological sciences, but in politics, philosophy, and even to an appreciable extent in theology. The teaching of science in French followed this development.

During the later part of the 17th century and in the early years of the 18th century, the influence of science tended to dissipate those elements of grace and beauty that had characterized the masterpieces of the 17th century, but fortunately this restricting effect was overcome and the language, retaining the essential elements of clarity and precision, acquired a flexibility that enabled it, towards the end of the century, to win international acclaim as the nearest approach to a universal language.

References

1. Halphen and Sagnac. Peuples et Civilizations:
"L'Eveil des Nationalités et le Mouvement
Liberal" par Georges Weill.
 2. L. Petit de Julleville. Histoire de la langue et
de la littérature française.
 3. Ch.-M. Des Granges. An illustrated history of
French literature.
 4. G. Lanson. Histoire de la littérature française.
 5. Abry, Audic et Crouzet. Histoire de la littérature
française.
 6. Ferdinand Brunetière. Etudes critiques. IV.
 7. Bersot. Etudes sur le XVIII^e siècle. VI.
 8. Ferdinand Brunetière. Histoire de la littérature
française classique.
 9. A. Chérel. Histoire de la littérature française.
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