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3. In several respects the rules observed in revising the Old Testament were not those of the New Testament Company. It is desirable that editions for the people be conformed in both Testaments to the same treatment. The difference is, for the most part, to the disadvantage of the Old Testament Company, notably in regard to the choice of an original text.

4. Notwithstanding the great excellencies of the R. V., it is still so marred by inaccuracies as to make it probable that it will itself have to be revised before it can prove acceptable to American Christians.

5. The value of the Revisers' work does not depend upon the adoption of its results. For their unselfish labors of fifteen years the church is profoundly grateful, and the publication of these results, with the discussion thereupon, must surely awaken an additional interest in, and impart a more intelligent knowledge of, that most transcendent of books, the Bible.

ARTICLE V.

ANCIENT BOOK-MAKING.

BY THE REV. HENRY PRESERVED SMITH, D.D., PROFESSOR IN LANE THEOLOGICAL SEMINARY.

THE large place books have in modern society is evident to the most unthinking. We are so accustomed to dilate upon the advantages of the printing press, that we sometimes think of books as the peculiar possession of our own day, or at least of the modern age. But books were in existence long before printing was thought of. The newspaper, indeed, is a result of the printing press, and we may claim it as our own—our advantage over the ancients is evidently not so clear as we had imagined. And even in this respect, we may say that the private correspondence of the ancients took the place of the public press. The letters of Jerome or of Augustine give us a running chronicle of affairs in their time, briefer indeed than the newspaper accounts, but not less perspicu-

ous, and certainly more elegant. In any case, if we are to make literature a characteristic (might we not say *the* characteristic) of civilization, this mark will put us into one class, not only with the nations of modern Europe, but with the Greeks and the Romans and the Hebrews. At the same time it will run a broad line between us and our own ancestors in the forests of Germany. The history of the book as an instrument of civilization must possess for us a very distinct interest.

The art of writing alone does not produce books. That art may be widely used and yet books may be unknown. We may conceive the extended monumental and mural inscriptions of Egypt and Assyria, without the papyri of the one country or the clay tablets of the other. Whether suitable book material will not always be invented when writing becomes fully developed, is a question we need not stop to discuss. It is generally supposed that the Phœnician alphabet, at least, was for a long time used by the lapidary before it came to the hands of the scribe—before ink and calamus were thought of, in fact. Even the extended epitaph of an Eshmunazer, however, or the long inscription which accompanies the bas-relief of an Assyrian king, could not be called a book. An essential thing about a book is that it is portable, so that it can become the private property of an individual, enabling him to study in his own home the thoughts of his fellow-men. Literature can retain its high place in the esteem of men only so far as it furthers this communion of spirits. The most rudimentary portable book seems to be the clay tablets to which allusion has already been made. The progress of Assyrian discovery has made every one acquainted with the existence of these. The writing was impressed while the clay was soft and the plate was then baked. Many thousand of these primitive books or leaves were stored in the great library at Nineveh, and it has been stated that each plate is marked with a number or device to indicate its place in the shelves. Some marks, of

course, must have been used to prevent confusion in so large a collection. The public librarian of our own day will probably concede some advantages to the tablets. They could not be carried off surreptitiously, on account of their bulk. They would stand a great deal of wear. Interesting passages could not be cut out by readers devoid of conscience, nor the page marred by impertinent exclamation points or by would-be witty comments. Nevertheless a bundle of clay tablets must have been a cumbersome and unsatisfactory substitute for a real book. At the present day we should deny it the name of book.

The book, although it does not come into existence at once on the invention of writing, cannot exist without writing. Nearly the whole history of writing precedes the history of the book. Our first chapter ought, perhaps, to be devoted to the rise of the alphabet—and a very interesting story we should find it. No art illustrates more clearly than does this one how slowly great inventions are brought to perfection. Finding its origin in the rude totem mark of the savage, we trace it through the picture writing of the early Egyptians to the rebus-like combinations which suggested syllabic division of words. As we follow this development we wonder not less at the ingenuity of the inventors than at the patience of those who had to use so complicated an instrument. We do not find it strange that reading and writing, instead of "coming by nature" to the many, were the serious vocation of the few—and they a privileged or sacred caste. We are no less surprised at the obtuseness which could not make the analysis (to us the simplest in the world) of words not into syllables only, but into the final elements, really so few in number, which we call letters. Perhaps the learned class did not desire to have their art made any easier, being jealous of its mysteries. We have heard of similar conservatives in our own day who have vague fears that education may become too general. Be that as it may, the alphabet had reached a

good stage of perfection before the book came into existence at all. We may therefore assume this history as already behind us, and start with the early book, leaving the clay tablet as only a rudiment. Besides the art of writing, we must have for a book suitable material. Tradition and philology give us the bark of trees as the earliest book material. But it is so early as not to come within the range of historic inquiry. In eastern Asia palm leaves have been written upon from very early times to the present. These nations, however, lie outside the stream of progress which most nearly concerns us. Passing these by, we find the materials at the disposal of the ancient book-maker to be two—papyrus and leather. Of these, papyrus was by far the most prominent in classic times.

The papyrus plant, it need not be said, is a reed or rush (*Cyperus Papyrus*) member of a widespread family of plants, represented in our own country by a number of species, which however attain no great size. The papyrus is among others what our Indian corn is among the true grasses, conspicuous for size and usefulness. Its original home was upper Egypt or Nubia, but it was introduced by cultivation into the Delta and (in the time of the Arab dominion) into Sicily where it is still found. We are told by Dr. Thomson that it is found also in the marshes of the Huleh, and that it is still known as *Babeer*, evidently the ancient name only slightly modified. Like most sedges, it grows in damp places, and seems to have thriven in shallow ponds or lagoons. It had, when cultivated, a running rootstock as thick as a man's arm, which grew to be twelve or fifteen feet long. This bore the triangular stems, each of which was seven or eight feet in length, and terminated in a broom-like head or panicle. All parts of the plant had their uses. The roots were cut for fire-wood, the pith was eaten by the poorer classes, the bark made excellent tow for caulking ships, and was twisted into ropes and even cables. A ship's

cable of papyrus is said to be mentioned by Homer.

But the most prominent reason for the cultivation of this remarkable sedge was that it furnished the paper of the ancient world. The process of manufacture is described by Pliny. The pith, which is probably not very unlike that of the American cornstalk was taken and split into thin strips, the thinner (we may suppose) the better. The strips might be as long as the pith from which they were made. As the business of manufacture was extended it had to be systematized, and it was found of advantage to work by fixed patterns. The strips were therefore made about the length of the leaf of paper required—in no case more than twenty inches, probably. The strips, when made in sufficient quantity, were laid side by side in a single layer on a wet board. Over this layer another layer was placed, the strips running at right angles with the former. It is yet a question among scholars¹ whether the material was made to cohere by paste of some kind, whether the Nile water had some glutinous property (which is generally supposed to be Pliny's view), or whether the natural mucilage of the plant was by wetting sufficiently developed to hold the two layers together. In some cases it seems quite certain that paste was used, and it is natural to suppose that it was used regularly. Occasionally more than two layers of the fibre were taken. While yet wet, the sheet (as we may call it by anticipation) was pressed between boards until it held firmly together, and was then dried in the sun. The rough edges were trimmed with shears and the paper was ready. In case the surface was not made smooth enough by simple pressure it was rubbed down with shell or ivory. If the leaf were of uneven thickness, or if it were too thick throughout, it might be moistened or beaten with a mallet.

We now have paper. Doubtless it would seem to us of

¹ The elaborate discussion by Birt, *Das Antike Buchwesen*, may be referred to for this point as well as most of the others in this paper.

poor quality, rougher at its best than the most fashionable linen paper of to-day, loose in texture, easily torn, and especially subject to injury by the damp. Such as it was, it was the paper of antiquity, and its manufacture was a lucrative monopoly of the Egyptian crown. But we have as yet only single sheets of paper—not a book. Natural as it may seem to us to fold the sheets in sections and bind these together, the ancients did not at first employ this process. The most natural way, as it seemed to them, was to paste or glue one to the other, making a strip long enough for the particular occasion. To dispose of such a strip easily, rolling was found simpler than folding—papyrus, being infirm in texture, would be injured by folding. In the roll we have the characteristic book of the ancients. The difference in form between classic literature and that of our own day cannot better be given than by describing theirs as a literature of rolls, while ours is a literature of folded sheets.

It may be profitable to delay a little longer on the roll, in order to clear up some matters of detail. In the first place the contents were arranged in columns or pages across the roll, the lines of the writing being parallel with the length. Very rarely, it would seem from allusions in classic writers, the lines extended across so that the whole formed a continuous page. Generally the pages were made to accord with the original sheets, so that they were separated by the seams. The reason for writing across is obviously that it is more convenient to hold a roll with the hands at the same level than to hold it with one hand above the other. The end of the writing was marked by the word *explicit* (in Latin writers), and when this point was reached the book was rolled up again its entire length. In reading, the left hand loosely rolled what the right unrolled. In some cases the writing was on the outside as well as the inside, and we remember that the Apostle John saw a book written on the back (i. e., on the outside) as well as within. In practice it was found that the out-

side was soiled and the writing was defaced by constant handling. It became customary, therefore, to write on the inside only.

It is obvious that a roll may easily become cumbrous, and ancient authors allude to the perplexities of those whose works were literally too *voluminous*. In too large a roll, the part already read (naturally more loosely rolled than the other) becomes unmanageable. A classic writer makes merry over a would-be orator who steps forward and begins to read from an immense roll. But the unruly corpus slips from his hand and unrolls itself on the floor as it glides many yards away from him. On account of this inconvenience, custom early fixed the convenient size of a single book, and book-makers adopted this as the standard size, and furnished blanks of the regulation length, all ready for the scribe. Each of these was fitted with a staff or roller in the centre. As the earlier leaves had much the most wear, it was customary to make the first leaves of the stoutest and best paper, and to grade from that downward to the last, which was of decidedly inferior quality. How much of this custom may be attributed to the tendency of human nature which even in our own day causes the best apples to appear at the top of the barrel, is difficult to decide. The breadth of the roll also was regulated according to a fixed scheme. The broadest in common use measured about ten English inches. So the pages of a classic book were not far from the size of these now before the reader's eye. Larger sizes are occasionally mentioned. After the book was written it was provided with a title and index of contents, which was pasted on the outside of the first leaf. A covering of cloth or leather was also made to preserve it from dust and wear. Rolls were often tied up, in order to make them more compact, and the string might be furnished with a seal at the owner's pleasure.

The fact that books of a regulation size were supplied to the publisher or author, is interesting to us, because its

influence on the form of literary works may be traced quite to our own day. The size of the book had to be considered in the composition of a work. It is impracticable to carry a work right on through a number of rolls, regardless of the break which comes at the end of each one. The process of rolling up one part and then uncovering another (perhaps with the added necessity of picking it out from a number and then untying it) makes a serious interruption in the thread of interest. It would be a shock to the reader to come to the end of a roll while in the full tide of the narrative or of the argument. Really ingenious authors kept this in mind. They provided for it by laying out their works in "books" of the required size. They grouped their material so as to finish a single topic within the limits of a single *volume*. In case of a narrative poem, for example, the book is made to end with the coming on of night, or with the conclusion of a truce, so that the enforced pause may seem to be a natural one. For the same reason the first paragraph of a book is often made a recapitulation of what has gone before, so that the interrupted thread may be readily taken up again by the reader. Sometimes, however, the writer himself is surprised by the end of the book coming upon him before he is through with the subject, so that he frankly confesses he had intended to say more, but he has reached the end of the book, or space forbids, or he is compelled to postpone what he has further to say to another book. Now the amount of writing that can be put into a convenient roll is much less than the amount of printing contained in a modern book. The twenty-four *books* of the Iliad filled originally as many rolls. We possess them in a single modest volume. The books of the Old Testament are in our hands in one volume in Hebrew; with the addition of the Apocrypha, they are in one or two volumes of Greek printed text. They were written in twenty-two rolls, as it would seem, and even then Alexandrian scribes, under the influence of classic models, di-

vided each of the books Samuel, Kings, and Chronicles, into two, to bring them to the standard size. It follows from all this that every work larger than a pamphlet had to be published in several volumes, and we need no longer wonder at the common form of titles exemplified by Augustine's "On the City of God, Twenty-four books." Classic tradition has in this respect powerfully affected subsequent literature. That we should divide our books (as, indeed, the ancients did also) into chapters and paragraphs, according to the natural suggestions of the subject, is to be expected. There is no outward coercion on an author to do anything more unless his work fills more than one volume. Yet many of our great literary works are divided after classic models into "books" whose extent is not that of the modern volume at all. The fashion is now dying out, but into the last century it maintained itself all over Europe.

When the material for books became abundant and cheap (comparatively speaking, of course), the Greek and Roman world blossomed out into a literary society. The increase of wealth gave men of cultivated tastes an opportunity to possess themselves of the thought of Plato and the rhythm of Homer. These set the fashion, and the fashion was followed by the mere bibliophile—a character satirized by Roman writers. They represent him as the man who collects books for the sake of having them, not for the sake of reading them; one who knew their pecuniary value, who was able to expatiate on the fineness of the material or the antiquity of the copy, who furnished his library in the most expensive manner, but who never perused more than the titles of his treasures. But the result of ostentatious as well as of genuine interest in books was to make the commodity popular, and the trade of publisher became a distinct vocation and a lucrative one. Cicero's friend Atticus, to whom so many of his letters were addressed, was a publisher and book-seller, and he seems to have acquired a fortune in the business. If we

are puzzled to know how such a business could be carried on in the absence of printing, a moment's reflection will help us. Of Roman methods, at least, we are tolerably well informed. Let us suppose Cicero to have a work just ready for the public. He first has a fair copy made by a scribe under his own eye (this often seems to have been made the dedication copy). He next sends it to the publisher, receiving in some cases at least an honorarium in return. The publisher has a number of slaves,—*librarii*,—probably Greeks by birth or education, whom the fortunes of war have thrown into the power of the barbarian. Fifty or a hundred or more of these scribes are seated in the work-room, each provided with a blank roll of the required size, and, of course, with *calamus* and ink. The foreman takes the author's copy and reads it aloud, the penmen writing at his dictation. A half day sees the fifty or the hundred copies finished, and in a short time an edition of any ordinary size could be ready. The cost, moreover, is not necessarily very great. There are on record cases of a book sold for a little over a dollar of our money. Money was, of course, many times more valuable than with us, and the book was in size no more than a pamphlet. Still, with these allowances made, it is evident that books were not extravagant luxuries, certainly not at all periods of the Empire. This is implied, moreover, in the further fact that an edition often (perhaps generally) consisted of a thousand copies, and that publishers were accustomed to ship their wares in considerable amounts to the colonies. On the other hand, it is not often that we hear of a second edition.

Just here is the place to speak of a subject which has called forth some discussion of late—*stichometry*. The discussion was started by the fact that a large number of manuscripts have come down to us with a note at the end saying that the work now completed contains so many *stichoi*. At the same time the actual lines of the manuscript do not generally tally with the particular datum.

Careful computation and averaging of the data, however, makes it probable (nearly certain) that the *stithos* was a fixed amount of writing, applied as a standard of measurement to all books. This standard line contained thirty-six letters or sixteen syllables. It would be easy, of course, to have the first copy written in lines of this length, or it would be easy to estimate the number of such lines in any book, as our own printers constantly estimate the size of a manuscript in pages or columns after counting a few words and lines. The reason for the size of the standard *stichos* was probably that the hexameter verse in poetry is of this length, hexameter being the meter most commonly employed. The system once applied to poetry was easily transferred to prose. Instead of a numeration of pages we have this calculation of *stichoi*. So Josephus speaks of his great work, the Antiquities, as containing so many thousand *stichoi*, where a modern author would have said so many hundred pages. The computation of *stichoi*, once made, remained the same for the same book, no matter what the form in which it was written, and the statement which was true in form only for the first copy was copied in subsequent ones. The reason was its convenience as a means of estimating the work done by the scribe, and so his earnings in case he were a paid laborer. In fact, we have a regulation (in the *Corpus Juris*) of one of the emperors fixing a scale of prices by the hundred lines for scribes, much as the writing and copying of legal documents has usually been paid for in modern times by the hundred words. By the number of *stichoi* the buyer could judge of the size of a book and decide whether he was paying a fair price. Such data, copied from manuscripts now lost, may yet be a check upon corrupted texts. Mr. J. Rendall Harris, recently of the Johns Hopkins University, has shown, for example, that the number of *stichoi* ascribed to the books of the New Testament agree very closely with the number actually contained in Westcott

and Hort's edition, differing in the Epistles by not more than one-fourth of one per cent.

We are now able to form an approximate idea of the ancient book, as it was in circulation from the time of Alexander the Great till near the fall of the Western Empire. Indeed, it lingered on considerably later. But for seven centuries at least it held undisputed sway. The question will be asked, how did the roll come to be supplanted by the *codex*, as we may call the book of leaves made after our fashion? The question may well interest us, for it seems altogether likely that if the older book form and book material had continued in use we should have had much less of Greek and Roman literature than has actually come down to us. Papyrus is notoriously perishable. The ancients themselves complain of its frailty. It suffered from wear as much as our poor qualities of unsized paper. It was peculiarly affected by dampness and mould, as we may judge when we consider the process of manufacture. A peculiar species of book-worm infested it, and it was the favorite nesting place of moths and of mice. Books left long rolled up stuck together and could not be unrolled without damage. As compared with parchment, or even with paper, this material was short-lived. It might last a hundred years with care. Rolls of a greater age were occasionally seen, but they were rare. If, now, our knowledge of ancient authors depended upon manuscripts written within a hundred years of the invention of printing, it is obvious that our body of Latin and Greek literature would not only be meagre but it would be inaccurate. This conclusion is not sensibly affected by the fact that in the exceptional climate of Egypt papyrus rolls have lasted till our own day.

The perishable nature of classic books would not itself have prompted a change of form. If a book will last a hundred years, the buyer is generally content. He gets it for his own use and enjoyment, and is not much con-

cerned that it should serve beyond his life-time. No one of us, probably, would refuse to buy a book because it would not outlast the year 1986. The same is true of the book-sellers. On the whole it would be rather a gain to them to have the more perishable material in use. The change from papyrus and the roll to parchment and the *codex* cannot be attributed to any general conviction that the old material and form would no longer serve. It must be accounted for partly by the improvements in the manufacture of parchment, partly and in much greater degree by the introduction of a new social force, namely, Christianity.

The skins of animals had been used as writing material from very early times in the East, and even when papyrus was most in favor we hear occasionally of *membrane*. The mode of preparation, however, was not such as to make this substance sightly or convenient. In one respect only had it the advantage over its rival; once used, the writing could be washed off or scraped off and the skin used over again. Where lamp-black ink was used (as it was very commonly) the erasure was easy and complete. As we know from the palimpsests of our great libraries, the process was less effective where gall inks had been used. But the same documents show that it was often used even in these cases, and with practical results. On this account membrane was used for temporary composition, first drafts, rough notes, any thing intended to serve for the moment. The sponge is mentioned, indeed, by ancient writers almost as often as the calamus. This may give us a clue to Paul's language, where, besides the books (*βιβλία* — *papyri*), he makes special mention of the parchments (*μεμβράνας*); the latter contained private and personal memoranda or notes (for sermons?). As the less popular material, leather was probably also the cheaper. When a man was too poor to buy a book he would borrow it and make himself a copy, and this was likely to be on leather. This relation of the two substances continued

till a natural or artificial dearth of papyrus caused more attention to be paid to the hitherto despised material. Tradition has it that King Eumenes of Pergamum founded a library designed to rival the celebrated collection of the Ptolemies at Alexandria. The latter potentates therefore prohibited the export of papyrus, and the Asiatics directed their efforts to the improvement of leather. Their success was such that the new article (for such it was in the fineness of its finish) was carried over the civilized world. It bore with it the name of its native place in its designation as *pergament*, which we have corrupted to parchment. However much of this account is legendary, it is probably right in attributing the manufacture to Asia Minor, where, as we have seen, leather had been in use for writing purposes from a very early time.

Let us note in passing that the general use of parchment favored a change in the form of the book. Leather can, indeed, be made into rolls of any length by sewing together a sufficient number of skins. The continued habit of the synagogue is evidence enough on this point. The toughness of leather, however, must early have called the attention of its users to the advantage of folding the leaves together. Three or four or five leaves folded and sewed at the back make of themselves a small book of convenient form,² and it was soon discovered that any number of such sections could be strung together at the back, forming the *codex* in distinction from the *volume*. It only remained to protect the sides with boards to have the modern book complete. When once perfected it must have shown distinct advantages over the roll. Both sides of the material could be used, for one thing. For the public reader with a desk before him, a book of this sort would lie open and leave his hands free. To find a par-

² Four leaves or sheets usually make up the quire in codices that have come down to us. Compare, on this point, "Les Cahiers des Manuscrits Grecs par Caspar René Gregory" (Extrait du Compte Rendu à l'Académie des Inscriptions et Belles-Lettres, le 7 Août, 1885).

ticular paragraph is much easier if leaves are to be turned over than if a roll is to be undone, and it is more expeditious to shut a book than to roll up a roll. Finally, such a book would hold considerably more than the roll without becoming unwieldy. As we have seen, an extended work was necessarily distributed among several rolls, and this necessity must constantly be kept in mind by the author. This division was a serious disadvantage. A great work like Livy's Roman History (142 books, so many separate rolls, of course) filled a whole library in itself. It became a serious problem to arrange such a work in any manageable shape, so that any desired number could be found at once. This problem was never really solved. The best that could be done was to tie the rolls in bundles of ten each, like so many fasces of umbrellas. Even then the bundles must be untied and the labels examined before the right book was found. But a codex would easily contain a decade or two decades of rolls. The work would thus be reduced to a small number of parts, and these could easily be labelled on the back. We are not surprised, therefore, to find the codex form preferred for certain books (notably the *Corpus Juris*) before it became the prevailing one.

In spite of these undeniable advantages, the conservatism of mankind and of the book trade still adhered to the old form a long time after the improvement in parchment. The change from the roll to the codex was only accomplished by the new force which changed the face of society—Christianity. A moment's reflection will enable us to realize this. In the first place, Christianity is the religion of a book. Mohammed did credit to his own clearness of vision when he put Jews and Christians under the head of "book people," in contrast with the rest of the world, and we can hardly wonder that he aspired first of all to provide his followers with a "Book of God" as a means to make their religion consistent and persistent. The emphasis laid by Christianity upon the Scriptures

made it natural for every Christian to desire a copy for himself. The custom of reading aloud from the Old Testament came to the Church from the Synagogue, and the New Testament was soon added to the volume. It needs no more to show that the demand for these books among Christians would be large. But books were expensive, and the Christians were poor. What more natural than that they should seek to supply themselves in the ordinary method of the poor man? Instead of going to a book-seller, who would, moreover, not have the book that was wanted, the Christian would borrow the church Bible and according to his ability make his own copy. Such copies were generally made on leather, as we have seen. They would naturally be made in codex form, because, among other things, the codex could be made to contain all the writings of the Old Testament, or of the New, or even of both. We see how this came to be the familiar form to Christians. As Christians became more numerous, rolls would grow less and less familiar, and as time went on the perishable nature of papyrus would become more and more apparent. Measures taken to preserve the contents of the now decaying rolls would first of all look to the introduction of a more enduring substance.

The demand for books among Christians, and the poverty in which they were generally found, are not the only causes which contributed to the change. We have already noticed the importance of service books in Christian ritual; we have noticed also the peculiar advantage of the codex form for this class of books. Still another thing must be borne in mind. In the clergy the church has a class of men whose especial care is the sacred volume. To the regular clergy was added, in the third century, a large body of monks. It was natural that these should give a part of their time to copying the Scriptures, and copying them in such a form as to be useful in the services of the church. It is altogether likely that we owe the earliest codices which have come down to us to this labor of the

monks. The fifty copies of the Bible prepared by Constantine's order as presents for the principal churches of the Empire were made under the direction of a bishop (Eusebius), and probably written by monks or students of theology. From this time literary men were found in the monastic orders. The codex in their hands took the place of the roll, and as the danger became obvious that ancient literature would perish in the decay of the material on which it was recorded, these conservators of letters rescued what came into their hands by transferring it from the ephemeral papyrus to the more durable parchment.

Beginning with the rude tablet of clay, we have now followed the book through the elegant roll, in which Cicero's essays met the eyes of his contemporaries, to the substantial vellum codex of the mediaeval monk. The reflections suggested by such a development are those suggested by all historical study, for this sketch is in a manner a type of all human history. First is the distinct confirmation of what has often been said: that intellectually we are akin not to our direct ancestors, the Gauls or the Germans, but to the nations of classic antiquity. We inherit from these our conception of literature. We have not greatly modified the forms of literature cultivated by them; and even the mold in which any single work is cast by the author of to-day shows the influence of classic models. Nowhere is this more strikingly shown than in our language. The word *book*, indeed, is said to belong to the main stock of our language, but almost every other which has to do with literature has a Greek or Roman parentage. A number of these are technical, as *corpus* (applied to a collected body of writings), *codex*, *palimpsest*. But others are of our every-day vocabulary. A *volume* was originally a book in roll form. A *tome* was a roll containing part of a work which filled several rolls—any one would contain a piece (τόμος) of the whole. *Bible*, *bibliophile*, *bibliopole*, *bibliography*, with the French *bibliothèque* and German *bibliothek*, all go back to the Greek *byblos* (βύβλος), the

papyrus plant. *Paper* is the Egyptian or Arabic name for the same plant, coming through the Latin *papyrus*. Many other words more or less intimately connected with literature—*chart*, *schedule*, *page*, *manuscript*, *literature* itself—testify that we are the descendants (intellectually) of the Greeks and Romans.

A second reflection is, that intellectual and material progress influence each other. Of the instruments of culture none approaches the book in importance. While we may abstractly conceive of a considerable degree of mental training where there are no books, yet practically civilization, as we know it, is a life of books. But the creation of books, as we have seen, is dependent upon the discovery of a suitable book material. This material once found, literature in the proper sense came into being, and the miracle was performed of conveying a man's thoughts not only to his contemporaries in distant lands, but to remote generations of races whose name he had never heard. This dependence of the intellectual life upon material conditions is strikingly seen in the later stage of book-making—a stage which we have not yet considered. This stage is characterized, of course, as the era of printed books. We are familiar with the immense multiplication of books by this process, which now puts a library within the reach of the day-laborer. It cannot be doubted that this process will powerfully influence the intellectual development of mankind. But the multiplication of books is dependent not alone upon the mechanical invention which we call the printing-press: the art of printing itself would never have been perfected without the prior introduction of a cheap, durable, available material on which the types could make their impression. This material was found in what we call paper—invented by the Chinese and introduced to Europe by the Mohammedans. This fabric (first made from cotton fibre) was so evidently superior, especially in cheapness, to all its rivals that it quickly displaced them all. Humanly speaking,

we may say that the Reformation of the sixteenth century, the creeds of the seventeenth, the revolutions of the eighteenth, and the material progress of the nineteenth, could not have been, had not the Arabs made Europe acquainted with the cotton paper of the Chinese. If something similar to these had taken place, it would have been different in many points from the history we actually know.

But if this side of the case is brought out by the train of thought we have followed, so is the other—the influence of intellectual forces upon material conditions. We have seen that early in the Middle Age a great transformation was wrought in the form of the existing literature. Slowly but surely the *volume* gave way to the hitherto despised *codex*, papyrus disappeared and was succeeded by parchment. This change was wrought by no one's set purpose. Probably no considerations of expediency would have effected it. It was the unconscious working of a new social and intellectual force. This force, working under the guidance of divine providence, but involving no human foresight or intention, became the conservator of what was most valuable in ancient civilization, stored it safely during the period of barbarian aggression, and brought it to light to be appropriated and diffused by a new culture. If Christianity, in one of its unconscious and minor influences, can change—has changed—the form of the world's literature, what may it not yet have in store for the race? Christianity is eager to make literature its ally. It avails itself of the printing-press as one of its most efficient missionaries. Under the influence of gospel ministers nations are now receiving books and letters who have hitherto been ignorant of any literature except the myths and legends which pass from father to son by oral tradition. Even nations which have a literature of their own (as the Arabs) are introduced to-day to new forms of thought and new methods of publication by means of Christian enterprise. We may reasonably ex-

pect that the intellectual activity involved in these movements will influence to a marked degree the material and the moral welfare of mankind.

It will not be deemed presumptuous to find further in this study an illustration of the words of inspiration, "Other men have labored and ye have entered into their labors." Our Lord uses these words of his disciples who went into fields already ripe for the spiritual harvest. But they are equally true of any single generation in the line of civilization. We inherit the accumulated experiences of the past. The forms of our present life are the result of wise adaptation by our fathers. Nowhere is this more clearly seen than in the case we have been considering. I take up a book, an ordinary book—certainly not an object of pretending appearance. To the savage it would seem a worthless thing. In fact it is an engine at which myriads of men have been at work through long ages. Further back than we can see, even with the latest investigations, Egyptian priests and scribes thought out a means of communicating thought by signs. The complicated tool was borrowed and simplified by the sea-faring Phenicians, who needed it for their commercial transactions. The Greeks, receiving it from them, made it the more complete vehicle of European speech, and the Romans (whether receiving it through the Greeks or not) made similar adaptations and passed it on to the nations of modern Europe—one of their most precious heir-looms. At the same time experiment was going on which had for its aim to discover a material on which this alphabet could be used to record a connected and extended narrative or train of thought. The bark of trees, wooden or waxed tablets, were tried with but moderate success. The Egyptians discovered papyrus and profited by its manufacture, and so the early book was formed. But this was only the first stage. For the trying time when literature was to be stored up in almost unknown recesses, parchment was brought into use. In the far East another race

was experimenting, and when the day dawned in which literature was to come out of its hiding and become a part of the world's daily life, they were ready with paper. Paper is good to write upon, but in this respect it did not advance the book beyond its second stage. Gutenberg and Faust must come with their movable types, and Watts with his steam engine, and the countless inventors who in these later times have made the engine use the types with such marvellous rapidity. All these—Egyptians, Phenicians, Greeks, Romans, Chinese, Arabs, inventors, paper-makers, book-binders—all have wrought that we may enjoy the little copy of *Pilgrim's Progress*, which costs us but a trifle, which we take up without a thought of its history, and which we perhaps throw aside after reading, as carelessly as though it were but a piece of wood. Other men have labored and we have entered into their labors. Intellectually, as well as spiritually, we reap the harvest which others have sown.