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EARLY ARABIAN PAPER MAKING.

THE date of the invention of paper, in the form in which it is used by the nations of the West, is almost as interesting a question as that of the invention of printing; for the former may almost be regarded as the necessary condition of the latter. It is certain, at all events, that neither the Eastern nor the Western nations invented printing until they had been in possession of paper for a long time.

The usual account of the introduction of paper into Europe is that it was communicated by the Arabs, who had received it from the Chinese. Broadly taken, this statement is correct; but it has until recently been associated with many errors of detail, both as regards the date and circumstances of the event, and the material and manufacture of primitive paper. The honour of dispelling these belongs to an Austrian scholar, Professor Joseph Karabacek, who has had special opportunities of investigating the question, from his thorough acquaintance with the magnificent collection of Egyptian documents drawn from the Fayoum by

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Archduke Rainer, a large proportion of which belong to the period of Saracen domination in Egypt; and his knowledge of early Arabian writers. His conclusions were published in an essay, 'Das Arabische Papier,' in the 'Mittheilungen aus der Sammlung der Papyrus Erzherzog Rainer,' Bde. ii., iii., 1887. A supplemental essay was added in 1897. It seems worth while to republish the substance of Professor Karabacek's articles in this country, as the only *resumé* that we have seen, that in the article on Paper in 'Chambers' Cyclopaedia,' necessarily omits many subsidiary details, and inaccurately speaks of an Arabian invasion of China, which never took place. Sir E. Maunde Thompson refers to Karabacek's essay in his 'Handbook of Greek and Latin Palaeography,' second edition, 1894, p. 44; but as he is writing on palaeography, and not upon history, merely for the manufacturing process. It will be understood that there is no originality in the summary which we are about to offer; we simply reproduce the results of the literary investigations of Professor Karabacek, and the scientific investigations of Professor Wiesener, which may be accepted with the more confidence as no one has attempted to controvert them.

The usual statement respecting the first acquaintance of the Arabs with paper-making is that they learned the art from Chinese prisoners of war upon the capture of Samarcand, A.D. 704. But there is no proof of its having been known to them at this period, and we shall shortly find evidence that it did not come to their knowledge for nearly half a century afterwards. Neither is the date of

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the conquest of Samarcand quite correctly given. We learn from the historian Taalibi that their first connection with this city was in 676, when they obtained a treaty according them the right of passage through it, but leaving it virtually independent until 712, when it was definitively subjugated. The submissive population, however, could not properly be described as "prisoners of war," nor is the conquest of the city connected with the introduction of paper by any Arabian historian. The event which really introduced paper to the Arabs, and through them to Europe, was the repulse of a Chinese invasion in A.D. 751. Two neighbouring princes, the chiefs of Fergana and Tashkend, having gone to war, the weaker party sought the intervention of China, which despatched an army to the scene of operations. The Arab governor of Samarcand, Zijad ibn Saleh, marched against this host, defeated it in the battle of Athlach, near Tashkend, and drove it back into China. Among his prisoners of war were persons acquainted with the art of paper-making, which was speedily commenced at Samarcand under their instruction, although, as will appear, with a notable difference as regards the material employed.

Such is the account of Taalibi, accredited by its author and simple and probable in itself. It is further undesignedly confirmed by a statement in the 'Fihrist,' an historical work of great authority, where it is said that according to some paper was invented under the Ommiade, but according to others under the Abbasside caliphs. This uncertainty might well exist, for the Ommiade dynasty

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gave place to the Abbasside in 750, the year before the defeat of the Chinese. It seems established, then, that the Arab manufacture of paper, the mother of the European, commenced at a date almost exactly as far in advance of the Christian era as the foundation of Rome was behind it :

‘Peace hath her victories,
Not less renowned than war.’

We have spoken of the Arab manufacture, as the work was undoubtedly commenced under Arab auspices, but, after the foundation had been laid by the involuntary Chinese teachers, the first workmen were probably Persians, since these would form the *élite* of the artisan class ; and the word denoting paper, *Kaghad*, is Persian. Professor Karabacek, however, does not believe it to be indigenous to the language, the only derivation offered, from a word signifying *to rustle*, being clearly unsatisfactory. He thinks it will prove to have been borrowed from the Chinese. Perhaps it is Turkish.

The Samarcand manufacture of paper is singularly interesting, not merely as the introduction of an art new to the West, but as the invention of a material for paper new to the world. It is on this point that the historians of paper have until recently been most in error. It being believed that the Chinese used cotton in the manufacture of paper, and the industry being confessedly derived from them by the Arabs, it has been assumed that the Arab paper was made from cotton, and that the manufacture from linen rags was a European invention of the twelfth century. These views have been exploded

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by the scientific researches of Professor Julius Wiesener, undertaken at the instance of Professor Karabacek, and published under the title 'Die Fajumer und Uschmûnene Papiere' in the Rainer 'Mittheilungen,' Bd. 2, 1887. Professor Wiesener finds that the Arab-Egyptian papers submitted to him hardly ever contain any cotton fibre, but are substantially linen, frequently exhibiting traces of rag, hemp, and twine. Upon more accurate investigation of the historical sources it further appears that the Oriental authorities never speak of paper as manufactured from cotton until we arrive at Joseph Casiri, a writer of the eighteenth century. There can be no doubt that the Arabs and their Persian assistants, finding that although they had got the Chinese art they had not got the Chinese materials, resorted to flax, which grows abundantly in Khorassan, and made their paper from the fibres of the plant, and afterwards from rags, supplemented, as the demand increased, with any vegetable fibre capable of serving the purpose. They, therefore, and not the Europeans, are entitled to the honour of this great and salutary revolution in the paper manufacture. Professor Wiesener's researches have rectified another error, which has reference to the sizing of the paper. This, in Oriental papers, is always vegetable, never, as in ours, mineral. It has been said to be gum tragacanth, but proves to be nothing else than starch paste. The sheet is usually found to consist of two thin sheets pasted together, the inside of each rough and unfinished, the outside smooth and fit for use. Finally, the invention of wired frames in the manufacture, which has

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always been considered European, is proved to be Oriental by the occurrence of straight-ribbed markings.

The successful development of linen paper at the expense of the papyrus, which had for so many centuries almost monopolized the markets of the civilized world, is a subject of much interest, and the data for it are fortunately ample. It does not appear to have been very rapid at first. The Coptic population of Egypt would naturally prefer the material to which they had been accustomed, and there was but little writing among the Saracens until the great intellectual outburst in the latter part of the eighth century. The small demand for official documents was, says an historian, abundantly met by parchment. A disposition to challenge papyrus is, however, evinced by the circumstance that the oldest kind of paper made at Samarcand was entitled 'Pharaoh' paper, and the descriptions which succeeded took the names of ministers and governors, indicating official patronage. One of these, El Fadhl the Barmecide, brother of Haroun-al-Raschid's famous vizier Giafar, is the person whose name is above all others to be connected with the growth of the paper manufacture. According to Makrizi, he induced his brother to substitute paper for papyrus as the material for all official documents. This incident is in all probability to be dated from his administration of Khorassan, the province adjoining Samarcand, and the principal seat of the paper manufacture, where he was governor in A.D. 794-795. This agrees with the observation of Karabacek that the oldest docu-

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ments on paper in the Rayner collection cannot be placed earlier than A.D. 800. That papyrus was still maintaining its ground a generation later may be inferred from the endeavour of the Caliph Motassem to transplant it to the Euphrates, A.D. 836; but about 860 it seems to have almost entirely collapsed in Egypt as a material for writing paper; and the inability of the makers to sustain the competition of linen paper led to such a degeneracy in the manufacture that papyrus was henceforth only used for packages and other ordinary purposes. Such documents of this period as we possess are usually opisthographic, *i.e.*, written on the reverse side of ancient papyrus scrolls of good quality, originally left blank. A letter written on papyrus in the tenth century has the postscript, 'Excuse the paper,' showing that the writer would have used linen paper if he had had it at hand. The fine bull of Pope John VIII., however, conferring privileges on the abbey of Tournus, now in the Bibliothèque Nationale, is written on Egyptian papyrus of good quality, showing that this material, perhaps a remainder from a former consignment, was still to be had by the Papal Chancery in 876. A few years later, the document, if upon papyrus at all, would probably have been upon the papyrus of Sicily. Palermo was conquered by the Saracens in 831, and Syracuse in 877. In both places they introduced the papyrus plant, which still grows luxuriantly in the river Anapo, near Syracuse, centuries after it has disappeared from Egypt and retreated into Ethiopia for more than a thousand miles. Respecting the papyrus of Palermo, the Arabian traveller and

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geographer Ibn Haukal informs us that about A.D. 960 it was grown in an extensive marsh adjoining the city, that the produce was chiefly employed for rigging ships, as King Antigonus is recorded to have used it in the Macedonian period, but that a portion was expressly reserved to make writing paper for the Emir. It was, therefore, neither exclusively used nor entirely disused for literary purposes. In the opinion of Karabacek, most of the papyrus documents of Europe belonging to this period are upon the papyrus of Sicily, which is still manufactured at Syracuse as an article of curiosity, and may be seen side by side with the Egyptian in the British Museum. The marsh mentioned by Ibn Haukal existed till the latter part of the sixteenth century; we are not told whether it continued to produce papyrus.

Ibn Haukal, who gives a full account of Egypt, makes no mention of the papyrus. It may therefore be inferred that it had ceased to be extensively cultivated by the middle of the tenth century, while it continued to be grown on a small scale as a material for coarse packing paper, and, extraordinary to relate, an ingredient in the pharmacopoeia. This was quite a new discovery of the Arab physicians, who unhappily considered that if the new papyrus was good for this purpose, the old was even better. Ancient papyrus scrolls were consequently sought for to be sold to the druggists, and none can tell of how much of the wisdom of Egypt and the literature of Greece we may have been deprived by this absurd hallucination. If Aesculapius was the son of Apollo, he was a most

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unnatural one! Papyrus is actually recorded to have been used for adulterating civet! It is mentioned as still growing in Egypt by the botanist El Nabati, A.D. 1216, and probably disappeared from the country about a century afterwards. Its inability to maintain itself without artificial cultivation suggests that it was not originally indigenous, but was introduced from Ethiopia by the Egyptians. It would be extremely interesting could we learn whether paper-making was in view from the first, or whether this was a later development.

We need not follow Professor Karabacek into his highly interesting chronological survey of the principal seats of the early paper manufacture in the East and in Europe. It is remarkable to find it flourishing in the remote province of Yemen in the tenth century. The question of the date of its introduction into India seems worthy of investigation. Linen paper is said to have been introduced from Samarcand into China in the tenth century, but does not seem to have maintained its ground. In 1897 Professor Karabacek published in the 'Mittheilungen' a supplementary article, giving an account of the chapter on the manufacture of paper in the 'Umdet el Kuttāb,' an Arabic treatise probably written in the eleventh century, but which received additions to the end of the twelfth, with which he had in the interim become acquainted. The only material for paper mentioned in this treatise is hemp, but the precise instructions given for its manufacture entirely confirm the conclusions of Professor Wiesener.

It would appear then, that, while the glory of

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the invention of paper, as well as the still greater glory of the invention of printing, belongs to China, that of the introduction of paper to the Western world, and of the discovery of a material which greatly improved and extended the manufacture, belongs to the Arabs and their Persian allies. Europe improved the quality of the product, but contributed little to the process of manufacture until machinery was called into requisition. It may be doubted whether the higher credit be due to the ingenious man who first thought of the flax of Khorassan as a substitute for Chinese material ; or to him who first augmented this source of supply by recourse to rags, one of the most notable instances on record of the multiplication of national wealth by giving value to an article formerly almost useless. It might be invidious to inquire whether the manufacture was in any degree promoted by the oppressiveness of Moslem rule in Egypt. About 1769 attempts were made to extend the manufacture of paper in Ireland, which an Irish journalist of the day, unconscious of the implied sarcasm upon his country, thought must certainly succeed *by reason of the abundance of the raw material*. It would thus appear that the beggary of a country may conduce to the prosperity of one of its manufactures ; and indeed, *paper* and *pauper* differ only by one letter. ‘God bless and keep Sultan Mahmoud!’ said the owl : ‘as long as he is on the throne we shall never want for ruined cities.’

R. GARNETT.