

character of the disease was recognised by lay observers long before it was accepted by science. The mental myopia which is, he says, apt to afflict science when untempered by letters is indeed apparent in this connection, and it is chastening to professional complacency to note the long list of lay writers from Thucydides onward who accept the truth of contagion from man to man, while the doctors agree in rejecting it.

The methods of cure vary little throughout the long period with which Dr. Crawford deals. The plague may be stayed by offerings of prayer and sacrifice. In this belief Marcus Curtius hurls himself into the abyss, or Solomon Eagle prays in the streets, naked, and bearing on his head a brazier of burning coals. Or scenic plays are performed with the double purpose of propitiating the angry gods, and of distracting men's minds. It is true that Livy notes when this treatment is first applied:—"The plays neither distract men's minds from religious awe, nor their bodies from disease"; but, for all that, the practice continues far down into the Middle Ages, when mystery and miracle plays are used as instruments of intercession with the saints.

Among the more material methods of treatment the kindling of huge fires is ordered by Hippocrates by way of curing the "distempered" atmosphere, which the Father of Medicine conceived to be the chief cause of disease in man. His example is scrupulously followed in the plague of London in 1666, and in that of Marseilles in 1720. Some physicians throughout the centuries advocate temperance in all things—especially in food and drink; others, again, see safety in intemperance. Dr. Nathaniel Hodges, for instance, holds firm belief in double doses of sack whenever exposure to infection is inevitable.

But for the most part medicine confesses herself helpless, and owns that the only prophylactic treatment likely to be successful is instant flight—tempered, perhaps, by purgatives or by "Armenian bole." This is the prescription of Galen, and it is only too faithfully adopted by physicians in plague-times after his day.

Many names, however, in the arenas of both medicine and religion shine out with radiance across this sombre background of ignorance and error. One of the most noteworthy is that of the intrepid Gregorius, who dissects three dead bodies in the vain hope of finding the cause of the scourge.

Science does move, moreover, even though it be but slowly, slowly. Little by little a code of sanitary precautions grows up, and superstition wanes as the true nature of the disease is recognised, and the right precautions adopted. Plague, exorcised by knowledge, vanishes almost entirely

NO. 2357, VOL. 94]

from western Europe before the end of the eighteenth century.

Dr. Crawford is, as we have indicated, specially interested in the beliefs and the behaviour of man under the stress and strain of plague-epidemics. In the history of the disease he finds striking evidence of the inherent tendency of the human mind to revert to savage instincts in face of crushing calamity.

But that, after all, is only one aspect of our more than Janus-faced mentality to which Dr. Crawford is, perhaps, a little less than kind. For, turned in another direction, it is our mentality which leads us away from the panics, despairs, and barbarities of ignorance, into the sanity and efficiency of exact knowledge.

E. H. MARTIN.

HISTORY AND ETHNOLOGY OF ASSAM.¹

THIS book is intended to supply a popular account of northern Assam and its borderland, the details of which are scattered through a wide and not easily accessible literature. The sword of the gallant author is mightier than his pen, and it is a subject of regret that the manuscript was not revised by someone with a keener sense of style. In dealing with the more obscure questions of archæology and ethnology he does not profess to write as a specialist, and if the book had been confined to an account of the savage tribes of the borderland and their re-

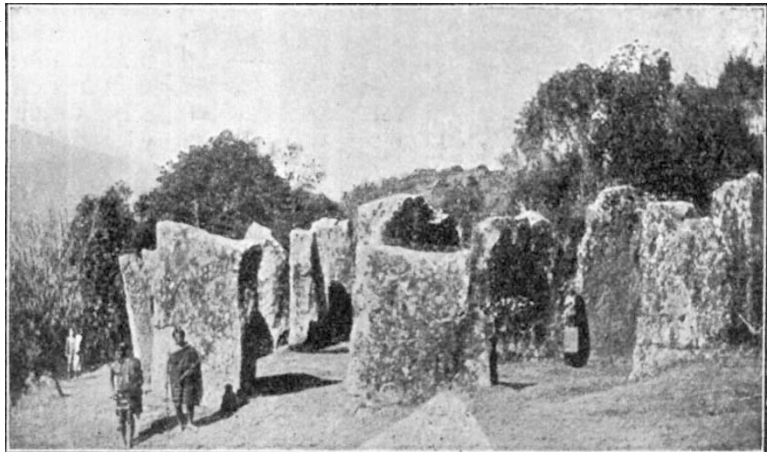


FIG. 1.—The remarkable "Stonehenge" at Togwema, Naga Hills. From "History of Upper Assam, Upper Burmah, and North-Eastern Frontier."

lations with the British Government, the local experience of the author would have found ampler scope. With these reservations the book is an interesting account of a country of which, be it said to our shame, the average Englishman knows little.

The best part of the book is the account of the tribes. Much has recently been done to extend our knowledge of these races by the admirable series of tribal monographs now in process

¹ "History of Upper Assam, Upper Burmah and North-Eastern Frontier." By Col. L. W. Shakespear. Pp. xix-272. (London: Macmillan and Co., Ltd., 1914.) Price, 10s. net.

of publication by the Government of Assam. Of these and of the valuable "Gazetteer of Upper Burma and the Shan States," by Sir J. G. Scott and Mr. J. P. Hardiman, Colonel Shakespear has made much use. But his own experiences have enabled him to add interesting material, and the large collection of photographs and drawings adds to the value of the book. It has passed the censor attached to the Headquarters staff in India, and it is creditable to that department that they have not suppressed the outspoken criticisms on our methods in the past of dealing with these troublesome neighbours. We have been too prone to delay action for the punishment of raids, to impose inadequate penalties on the guilty tribes, to use



FIG. 2.—Angami Nagas. From "History of Upper Assam, Upper Burma, and North-Eastern Frontier."

large and expensive expeditions to effect what might have been, and has been, done by smaller detachments. Hence, we have met with many regrettable incidents which by prescience and better management might have been avoided.

The publication of the book is timely because it impresses the need of a firm policy on this frontier, particularly as China is beginning to show her power. If the new Republic succeeds in organising an army capable of meeting disciplined troops we may have trouble before us. To meet this emergency the extension of our railway system to the strategical points on the frontier is an obvious necessity.

NO. 2357, VOL. 94]

COLLOIDAL CHEMISTRY IN RELATION TO INDUSTRIES.¹

II.

PRACTICALLY the only inorganic colloidal preparation made on a large scale at present is the colloidal graphite manufactured by Acheson and used as a lubricant under the name of "Aquadag." Colloidal tungsten was at one time employed in the manufacture of squirted filaments for incandescent lamps, but these have been superseded by drawn wire. The use of colloidal sulphur as spray for hops and vines has been patented and seems likely to be more efficacious than the coarser suspensions of flowers or milk of sulphur.

Of far greater technical importance, however, than these colloidal preparations of inorganic substances are the bodies which, to the layman, are exclusively suggested by the terms "Colloids" or the colloids of Graham. This class comprises such important constituents of organic raw materials as albumen, hide substance, starch, and cellulose; also the various derivatives of the latter, india rubber, gutta percha, and, finally, many manufactured products, among which glue and gelatin may be mentioned as typical. These various substances naturally exhibit a somewhat bewildering variety of individual behaviours, and it is therefore impossible to do more than refer to some properties they possess in common.

Most of them in contact with water—or, in the case of india rubber and nitrocellulose, in contact with certain organic solvents—exhibit the phenomenon of swelling, *i.e.* they imbibe the liquid with increase in volume. The process may either come to an end without solution or dispersion, as with cellulose, or it may proceed as far as the latter either at ordinary or higher temperature, as with albumen and gelatin respectively. This swelling is obviously an inevitable concomitant or antecedent of any treatment with liquids, and therefore of importance in processes differing as widely as tanning and malting. It is well known empirically that the amount of water taken up is affected by even small concentrations of acid, alkali, and neutral salts. The important fact brought out by colloidal research is that this action, particularly in the case of neutral salts, is in no sense chemical, since it is the same on substances differing as widely as gelatin and agar. This knowledge has already been of great value in elucidating the *rationale* of many empirical processes, and its systematic application is likely to be far-reaching. Particularly interesting is the effect of iodides and thiocyanates, which promote the absorption of water to such an extent that, for instance, gelatin dissolves in *cold* solutions of such salts, and that cellulose (as has been shown by v. Weimarn) can be dissolved in hot solutions of calcium iodide or thiocyanate.

A further general rule is that solutions of all these bodies, whatever their nature or that of the solvent, exhibit two peculiarities: the physical

¹ Continued from p. 422.