

say. If only a score or so of letters, he of course can exhaust the possibilities and show that no other arrangement is possible. If he allows himself a greater latitude he cannot always do this. Again, if he employs a consistent and constant method of deciding just how much text to include in each of his shufflings, he is on better ground than if he takes as much as he needs to get letters which he can twist into sensible Latin.

It will be inferred from this account that the writer is not enthusiastic about Professor Newbold's translation. Professor Newbold himself admits the serious ambiguity of his process; he states explicitly that at two stages of the decipherment the indeterminate element enters so strongly that there is presented the necessity for exercising what he calls "judgment." We have another and slightly less impressive word for this—it is "guessing." Unless the guessing can be eliminated, we do not regard Professor Newbold's claims that he has translated the cipher as warranted.

As a matter of fact, Professor Newbold realizes this himself, we believe. For one thing, he emphasizes that the translated text and the picture ought to harmonize. This is true enough, but we are surprised that it is urged in favor of the "decipherment." For in practically every case where "decipherment" has yet been effected, the picture is such as to suggest quite strongly, not perhaps what the text should say in order to harmonize, but at least what it should talk about. Guessing with a guide, even one which is followed unconsciously and without evil intent, is not the same as just guessing; the result at once begins to depend upon the guide as well as upon the guesser.

In at least two cases Professor Newbold has scored what he puts forward as a notable triumph. One of the drawings was submitted to an astronomer for an opinion as to what it represented; the verdict was that it unquestionably was a crude effort to draw a spiral nebula. After much work on the caption of this drawing—that is to say, upon what a modern editor would call its caption—Professor Newbold evolved out of it a statement that, using a refracting mirror, the scribe had seen, at a point in the heavens which he identifies in terms of the Navel of Pegasus and other ancient marks, a star shaped like a snail shell. His localization of this apparition is a very good amateur attempt to describe the position of the Great Nebula of Andromeda. This page is the basis for the claim that Bacon discovered the telescope.

In another case we have a drawing, reproduced herewith, which we think will be agreed to have strong astronomical leanings. The translator found in connection with this the statement that the observer had seen what he described in terms showing clearly that he is talking about an annular eclipse; and the date of the observation is given. Checking up by the department of astronomy verified this date (in the thirteenth century, of course) as that of an annular eclipse. And when we have had it suggested to us, we can see that there are things which the drawing resembles less than it does an annular eclipse.

Professor Newbold states that in both cases he was quite without the knowledge in point until he had read it in the manuscript. Leaving quite aside the question of his good faith, we wonder whether he is sure of this. He has done a vast amount of reading in connection with medieval manuscripts and medieval lore in general. It is not for a moment to be supposed that he consciously remembers everything that he has ever thus read. In view of the mathematical probabilities inherent in the methods of decipherment which he permits himself, we consider it at least equally likely that something which he has read has cropped up subconsciously and influenced his translation, as that he has really reproduced the words of his original.

As a matter of fact, in the case of the Andromeda nebula, the translator is sufficiently out of luck to suggest strongly that this is what has happened. The ordinary spiral nebula does look much like a snail shell, and might very likely be

thus described by one seeing it for the first time; and the Andromeda nebula is a spiral one. But it just happens that we are looking at this nebula almost due edgewise, so that the spiral effect is greatly masked by perspective; our photograph shows this clearly. We have the gravest doubt that anyone not thoroughly acquainted with spiral nebulae and star clusters would ever identify this object as of the former rather than the latter class, or ever see a snail-shell effect in it. And when Professor Newbold's colleagues of the department of astronomy assure him that Bacon couldn't have seen this nebula as a spiral—even as so much of a spiral as our picture reveals it to be—without a telescope, they are putting it mildly; they might equally have said that he couldn't have recognized this feature of it without a telescope of decidedly high power.

We are rather inclined to accept the manuscript as from Bacon. Until further progress is made, and in the expectation that further progress, if it is made, will result in the further rationalizing of some of the steps of decipherment, we are not prepared to accept the translation. Professor McClung, when called upon to substantiate the claims of Professor Newbold that certain of the drawings possessed certain biological significance, came as close to flat contradiction of this possibility as the courtesies of the occasion permitted. He did flatly contradict it, so far as his own judgment was concerned, in seven out of nine exhibits; in the other two he was not so certain but it was plain that he felt the symbolism of the drawings to be so excessive that no objective representation could properly be claimed for them. Our state of mind with regard to the cipher rendition is about the same as his with regard to the drawings. The manuscript and the efforts to read it are of extraordinary interest; but we do not consider that definite statements of results should have been made at the present stage.

It will be remembered that the Shakespeare-(Francis) Bacon cipher possessed an indeterminate element, in that the reader might look in a large number of places for the next letter. The enthusiasm of those who claimed that Shakespeare didn't write the plays waned noticeably when some mathematically inclined gentleman—was it the astronomer, Proctor, in the remarkable paper, "Knowledge," which he edited for some years?—showed that with the freedom of judgment exercised, the probabilities were many millions to one that the desired message could be found. When Professor Newbold incorporates two indeterminate steps into his decipherment, he does not seem to be on any better ground than the lamented Ignatius Donnelly.

TREPHINING AMONG THE PREHISTORIC INDIANS

TREPHINING was of common occurrence among prehistoric Indians of South America, and is still practised in Bolivia and Peru. Where stones from slings, the "bola" or "llui" and wooden clubs with heads of stone and copper were the common offensive weapons, complex fracture of the skull with depression of the bony plates must have been very common. A fracture of the skull sometimes resulted in almost instant death, but many victims survived wounds of this sort, and an attempt to remove splinters of bone that pricked the brain, or to cut out fragments that pressed upon it, must have become, at an early date, a natural procedure.

To the American Museum of Natural History belongs credit for investigations in Peru and Bolivia which revealed much interesting information as to ancient pathology and surgical practices in these regions. Of nearly 1,200 skulls collected on one Museum expedition in Bolivia, conducted by the late Dr. Adolph Bandelier, about 5 per cent of the skulls had been trephined. The members of the party discovered, furthermore, that trephining is practised in Bolivia today, by medicine men. The operation is performed with any available cutting instrument, and the process is one of incision and scraping.

The Indians apply "coca" to wounds, bruises and contusions for healing purposes, and it tends to deaden pain.