

III.

PTOLEMAIC SCOTLAND. BY I. A. RICHMOND, CORPUS CHRISTI COLLEGE, OXFORD.

Some new suggestions based on recent research and on the work of Glazebrook Rylands, F.S.A.

It has long been realised that the British section of the geography of Ptolemy represents a state of affairs on the northern frontier which has no place in the frontier system as reorganised by Hadrian in Britain. In Scotland especially this fact has been so patent as to have aroused many counsels and conjectures of despair.

We may admit that the picture which Ptolemy gives of Scotland is far from clear, that the whole country is twisted into a strange and fantastic shape, that the place-names seem to fall in most unlikely positions; but at the same time we may note that through all the chaos and confusion there seems to gleam just enough of order and meaning to make us feel that the geographer had access to material that might have given him an excellent picture of Roman Britain, and that might yet be unravelled if a clue upon which to work could be found.

On the mathematical side of the question, such a clue has long been waiting. The method of treating the Scottish coast-line as shown by Glazebrook Rylands in his work *The Geography of Ptolemy Elucidated*,¹ gives a reasonable solution, and puts the conflicting evidence and all too scanty knowledge of Ptolemy clearly and definitely before the reader. But Rylands did not attempt to deal with the land-stations beyond Trimontium,² which he showed to be Newstead near Melrose; and the reason for his forbearance is not far to seek.

Since 1893, the date of publication of Rylands's book, the spade has taught us much about Roman Scotland. Historical gaps still exist, and there are dark corners that still await the light, but for all that, we now know more of Roman Scotland than the most sanguine archæologist a generation back would have dared to hope. We can now give something much more than an outline of the geography and history of Roman Scotland; therefore the time is ripe for a new investigation of the Ptolemaic geography, for we have access to material of which Rylands could have known nothing.²

¹ *The Geography of Ptolemy Elucidated*, by Thomas Glazebrook Rylands, F.S.A., etc., printed for the author by Ponsonby and Weldrick at the University Press, Dublin, 1893.

² See Rylands, p. 68.

It will be worth while before we proceed to detail to look at the map of Ptolemaic Scotland as it stands (fig. 1). We may note at once that Ptolemy had evidently far the best acquaintance with the eastern coast of Scotland. Indeed, Rylands's conjecture, that possibly the western coast geography was derived from Philemon's account of Ireland,¹ may well be correct; while, as Dr G. Macdonald has recently shown,² it is likely that the eastern coast was well known to the Romans in Agricola's time.

Now we know that the eastern road between the Cheviot and Inchtuthill in Perthshire, hard by the great bend of the river Tay, was the one and only deep line of penetration into Scotland that was held by the Romans in permanence before Antonine times (A.D. 140-180), and thanks to the recent research of Dr Macdonald, we now know that this line was held for long after Agricola's recall, at least until after the accession of Trajan. On the eastern coast, therefore, we would expect to find a certain amount of accuracy and of confirmation of archæology in Ptolemy's account of Scotland.

In Ptolemy's map we find an eastern coast-line which for all its faults is unmistakably clear from the Tweed as far as the Moray Firth. Also we may note that among the land-stations, although for the most part their positions seem unlike anything that we know of the topography of Roman Scotland, there would appear to be a very definite scheme of plotting out. In one case only, however, may we see immediately that a land-station is in its proper position. 'Oppéa on the Tay (Τίνα ποταμός) must be the Roman fort at Carpow, for its position is exactly right. We may think that here, at the junction of the Earn and the Tay, was one of the sea-bases which formed the pivots of the long line of road that passed northwards from Tyne to Tay. The name, furthermore, is a simple corruption: it has nothing to do with Orrok or the water of Ore; it is not even a Keltic place-name; it is simply corrupted from "Horrea," the Roman "store-houses"; that is, the "store-base" *par excellence*.³ Therefore in Horrea we have unquestionably a point from which we may start on part of our inquiry. Now let us turn to the question of the distortion of Scotland itself.

It will only be possible to give an outline of the work of Rylands in this short article. The work itself fills a fairly large volume, and I may therefore refer my readers to it, and merely summarise the results here.

¹ See Rylands, p. 80, footnote.

² See *J.R.S.*, vol. ix., part 2, p. 138.

³ We may compare Ptolemy, *Geogr.*, iii. 9, v. 1, where 'Oppéa is corrupted in some MSS. to Oppéa, the Horrea Margi of the Peutinger Tablet. See Macdonald, *J.R.S.*, vol. ix., part 2, p. 138.

1.

PTOLEMY'S MAP OF SCOTLAND.

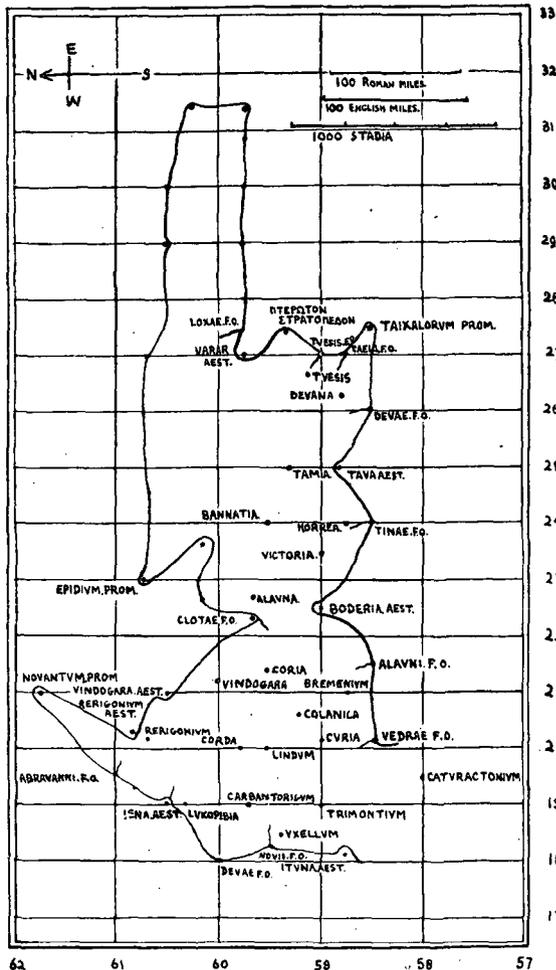


Fig. 1.

In Ptolemy, *Geogr.*, i. 2, the geographer gives an account of the two classes of data which he proposes to use for his map. He writes: "In such a survey, and in the accounts of it, part of the data are geometric and part meteoroscopic: the geometric method determines the position of places by base measurement of their distances; the meteoroscopic, on the other hand, by observation taken by the astrolabe and gnomon,—the latter method is more satisfactory and accurate, while the other is more general and dependent upon the meteoroscopic." But when the geographer comes to actual work he finds that there are too few astronomical data (meteoroscopic) to serve his purpose; and therefore he says, "it would then be reasonable that a person undertaking to make a map according to such data should first lay down in his delineation, as foundations (καθάπερ θεμελίους), the points derived from more accurate observations; and next, he should fit into these the information derived from other sources until the relative positions of the latter to one another be found to preserve, with their relative position to the fundamental points, as near an agreement as possible with the more accurate reports of travellers." Such in brief are the principles upon which Ptolemy worked; and through the labours of Glazebrook Rylands we may see them amply exemplified in his map of Scotland.

It was not until Rylands had worked for some time upon the distortion of Scotland, and had already developed a theory which sufficed to explain much, but which did not by any means explain all difficulties, and with which its originator was not well pleased,¹ that the final solution of the difficulty suggested itself.

It was observed that by the time Ptolemy had mapped out the world as far west as Britain there was a large error in his calculations through projection which made Londinium, his first fundamental station in Britain, 3° 29' too far north and nearly 4° too far west. Then if a gnomon observation or an observation of a lunar eclipse were taken in Scotland, the point at which they were taken would not be far from its real and true position.² Otherwise stated, this point would have an apparent error of nearly 4° too far east and 3° 29' too far south, just a reversal of the error of Londinium. But the consequences of such an error reach further than this: they necessitate a right-angled turn and a change from longitude to latitude and vice versa of points between the last fundamental station—which for Scotland was Caturactonium—and the point which had been plotted out by observation. A perusal of plate xv.

¹ See Rylands, p. 68.

² Such an observation was actually taken at *Ἰππερωτῶν στρατόπεδον* (see *Geogr.*, viii. 3, 9), and was very nearly right. Bad observations elsewhere ousted this good one.

in Rylands's book, of his appendix, and of his introduction will make it quite clear that this is what happened in the case of all Scotland.

Then following these considerations we may proceed to put the coast of Scotland into order. This may be consistently done by letting the latitude stand as before and reducing the longitude by one-half. We shall not concern ourselves with the western or northern coasts. On the east coast the process begins at *Alauni fluminis ostia* (the Tweed).¹

The next process is to turn Scotland through a right angle. This may be done by using *Vedrae fluminis ostia* (the Wear) as a pivot. But we may note in passing that *Vedrae fluminis ostia* is itself about fifteen minutes too far south.² Making the appropriate change, therefore, and turning Scotland about *Vedrae fluminis ostia*, we shall have reconciled for purposes of elucidation the meteoroscopic and geometric data in Ptolemaic Scotland.³ Ptolemy, as we have seen, had bound himself to choose the meteoroscopic data before any others, and was therefore compelled to distort Scotland: all we have done is in some measure to retrace his steps.

The results of this twin-process are far-reaching and of great interest. Trimontium—as Rylands noted⁴—at once falls into place as the fort at Newstead that we now know so well. Nor is this all; four points north of Trimontium come into position as forts along the eastern road. The site of the first of these forts lies between Trimontium and the next station Colanica, which latter site is clearly the important fort at Cramond on the Firth of Forth. In this district we know of two Roman sites: the first, Inveresk, lies too far north for the position assigned to Curia; the second is a site which has not long been generally recognised to exist.⁵ It lies on the northern slopes of Soutra Hill, not far away from Crichton and almost exactly in the position given by Ptolemy to Curia. Therefore we may now think that the Crichton site is an early one, which will doubtless repay excavation some day.

Passing by Colanica, which represents Cramond, we come to Lindum, the next site. The manuscripts of the *Geography* vary as to the exact position of this fort: many read $K\Gamma'$ (23°), three read K' (20°), and one reads $K\Gamma''$ ($20^\circ 20'$). It seems best to think that K' (20°) was the original reading and that the others are merely stages of corruption. If we read $K\Gamma'$ (23°), then Lindum forms an extra fort further north for which there is no warrant at all. On the other hand, if we read K' (20°), Lindum fits in at exactly the same distance from Colanica as Camelon is from Cramond. It seems best, therefore, to read K' (20°) and to accept Lindum as Camelon fort. We may note that there is no hint of a fort between Camelon and

¹ See fig. 2, A.

⁴ See Rylands, p. 68.

² See Rylands, plate xiv.

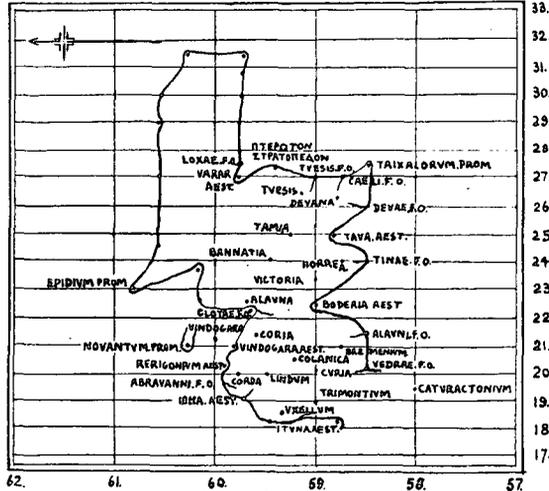
⁵ See *Proc. Soc. Antiq. Scot.*, vol. lii. pp. 211-12.

³ See fig. 2, B.

2.

SCOTLAND REDUCED.

A.



SCOTLAND TURNED.
[WITH ALLOWANCES.]

B.

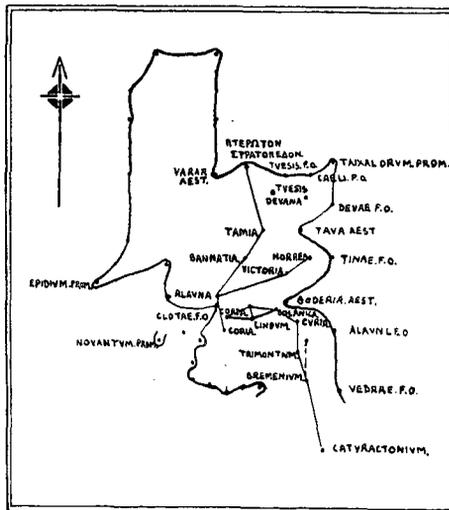


Fig. 2.

Cramond. The country is easy and flat, land over which twenty-five miles is not a very long day's journey. But it is likely that at least one fort—not an important one—filled this gap. The next point, Corda, lies beyond Lindum and some distance up country from the Firth of Forth. It seems to represent a fort which may not impossibly have been one of the links in that chain of temporary forts flung across country from Forth to Clyde by Agricola. Such a fort would be kept on to guard the vulnerable flank of the Carse of Stirling from incursions from the south-west, a very necessary condition of safety for the eastern road and one which Camelon does not quite fulfil.

The angle Lindum-Colanica-Curia is somewhat sharper than is really the case; but we may note that there is an inferior reading which makes the position of Colanica $20^{\circ} 30'$ instead of $20^{\circ} 45'$, and this makes the difference. But so small a difference in angle does not seem to constitute sufficient reason for a rejection of the testimony of the three best codices.

It is noteworthy that this piece of road from Trimontium to the Carron valley was not properly mapped in relation to the coast by Ptolemy. It would seem that either the geographer did not realise that Colanica was situated on the Firth of Forth, or that he did not make the comparatively simple reconciliation which his data demanded. In either case, this interesting fact suggests that the chief port of this period was Horrea, the store-base at Carpow, and not Cramond on the Forth, a marked difference from the circumstances of later times. In this connexion we may note that Bremenium, which Ptolemy placed $45'$ north of Caturactonium, was moved the same distance east as well when the twist of coast was made. Evidently Ptolemy felt that a point which lay south of the Cheviot, and therefore just between the conflicting data, ought to be moved, but did not do the same to the road beyond.

Thus far our way is clear: beyond the Forth more serious difficulties begin; even here, however, there are at least two clues to a way out. The first is the fixed position of Horrea and the Tay. The second is in a sense bound up with the first but needs fuller explanation.

It is evident that among ancient geographers there was always a certain confusion about long lines of coast that did not lie either due north and south or due east and west; and when the coasts were not very well known the confusion grew worse. A notable example is the Indian coast, the direction of which was a well-known crux among Alexandrian geographers.

But the eastern coast of Scotland, as bordering on and not far beyond the limits of the Empire, was better known than the El Dorado of the Indian Chersonese, if we treat it apart from the right-angle distortion.

And, curiously enough, the confusion here results in a setting-out which is half right and half wrong. The double reading of the manuscripts in the case of Ταύνα ἔισχυσις of 58° 30' and 58° 50', and in the case of Τίνα ποταμῶν ἐκβολαί of 58° 30' and 58° 45' points the way in which we must look. In the former case the best manuscripts read 58° 50', in the latter case 58° 30'.¹ But here analogy in the rest of Britain comes to our aid. In very early times there was a corruption of half a degree in latitude in the position of Caturactonium and Londinium, Ptolemy's fundamental stations in Britain. Rylands, in plate xiv., has shown how very serious an influence this had on the coast of Britain. When the error was put right at these stations some of the other stations near by were put right, others—for example the Wash and Spurn Head—were not. This is evidently what really happened at Τίνα ποταμῶν ἐκβολαί. The best reading in this case evidently represents the original reading, which should, however, have been changed when the fundamental stations were changed by half a degree of latitude; and for this reason we may have no scruples in changing the reading to 59° instead of 58° 30'.

So much for Τίνα ποταμῶν ἐκβολαί; but this change involves yet another. As we have seen, Horrea is governed by the Tay mouth and therefore must be moved accordingly. When this has been done a very interesting piece of evidence meets our eyes, one which goes far to confirm the correctness of the step that we have taken.

From the position of Bannatia on Ptolemy's map it has long been conjectured that here was the fort at Dalginross. Hitherto its distance from Horrea has set such a conjecture at defiance, however probable it might have seemed. But the change in the position of Horrea, which, as we have seen, has been made for entirely different reasons, brings Bannatia into proper distance from Horrea.² This fact gives much encouragement for the success of further effort.

Yet here the question becomes more complicated. We have still five stations, Victoria, Alauna, Coria, Tamia, and Περρωτῶν στρατόπεδον, left unidentified. In the first place, two of these five names, notably Victoria and Περρωτῶν στρατόπεδον—for στρατόπεδον at least means the technical "castra"—cannot belong to native sites; they must belong to Roman forts. In the second place, we may be quite sure that no Roman fort existed in Flavian times in the Lanarkshire uplands, the position which Ptolemy according to his figures gives to Coria, nor yet hard by the Moray Firth, the position of Περρωτῶν στρατόπεδον. Equally, Victoria has now lost its former relation to Horrea and Bannatia. On the other hand, if we look at our original map of Ptolemaic Scotland, as shown in fig. 1, these sites are just the ones which give the strongest suggestion

¹ See fig. 1.

² See fig. 3, A, for both old and new positions.

that in Scotland Ptolemy definitely employed his regular system of triangular plotting out. The remedy, therefore, lies in our own hands. We may either adopt a *non possumus* attitude and, leaving the sites and our calculations as they stand, reduce an experiment of no small promise to a palpable absurdity, or we may act as follows. We may keep the old angles between the sites but reduce the intervals in the ratio of 1:3. This is the ratio of the difference between the real distance apart of Bannatia and Horrea and the distance as given by Ptolemy through an error of thirty minutes of latitude.

If we adopt the latter course we are at once rewarded by the result. Victoria falls into place as *Strageth*; Alauna and Coria become Ardoch and a site further south, the fort that surely existed at the crossing of the Forth near Stirling. Tamia and Περρωτὸν στρατόπεδον become forts within reasonable striking distance of Bannatia. But the fact that these two forts lie within easy distance of Bannatia gives us a clue to another sort of error. We know that Bannatia lies on a branch road, but from Ptolemy's plotting out it is quite plain that he considered the northern road to have passed through Alauna and Bannatia, and Victoria and Horrea to have lain on the branch road. Without an accurate knowledge of the topography of Central Scotland this is not an unnatural mistake to make. This conjecture, furthermore, is borne out by the position of Περρωτὸν στρατόπεδον, the terminus of the northern road. After the reduction in the ratio of 1:3 it is no longer doubtful where Περρωτὸν στρατόπεδον must be. It must be the site at Inchtuthill, and thus the reason for the name, for στρατόπεδον as a simple translation of the technical Latin "*castra*" and for περρωτὸν as a mistranslation of something a little more technical—as we shall see—becomes perfectly plain. The well-fortified legionary campaigning-base at Inchtuthill¹ is one of the predominant features of the site and provides ample reason for the nomenclature. But when the reduction is over, this site appears to lie too far to the west. The size of this excess is interesting, for it is exactly the same as the distance between Bannatia and Victoria.² We may therefore transfer Περρωτὸν στρατόπεδον to its proper position, and move Tamia accordingly. The latter site then becomes the fort at the junction of the Tay and the Almond, which may well be of early date.

Such are the results of reduction by ratio and of an allowance for a very pardonable error. Perhaps the most interesting and important confirmation of our procedure lies in the fact that only now do the stations which Ptolemy must have originally calculated from Caturactonium—(had it not been so he would have told us)—and those which we have calculated from Trimontium (and hence from Caturactonium)

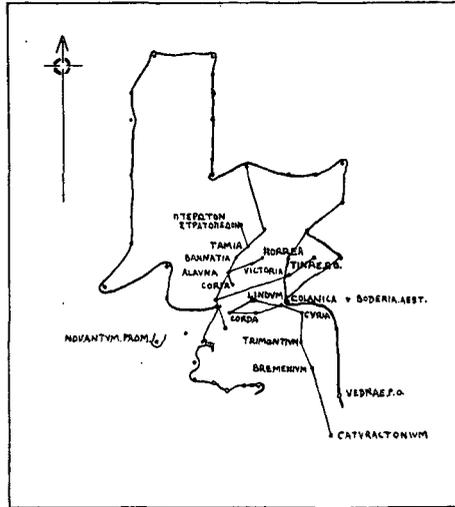
¹ See *Proc. Soc. Antiq. Scot.*, vol. xxxvi.

² See fig. 3, B.

3.

REDUCTION BY RATIO.

A.



B.



PTOLEMAIC
SETTING-OUT

100 ROMAN MILES.
100 ENGLISH MILES.
1000 STADIA.

C.



MODERN
SETTING-OUT

Fig. 3.

and from Horrea come into close and intimate connexion. The fort Coria on the Forth not only becomes the right distance from Ardoch (Alauna) but also from Camelon (Lindum).¹ We thus get a connexion with what we may call the southern system, as opposed to the stations calculated by us from Horrea, which can leave no doubt in our minds that Caturactonium was indeed the fundamental point from which all the stations in Scotland were measured.

Let us trace the steps by which the Ptolemaic map assumed its final form in Scotland. The first great change was necessitated by the clash of geometric and meteoroscopic data. If Ptolemy was to keep to the principles that he had found successful elsewhere, then it became a question of the best reconciliation of these data. Thus Scotland was of necessity² turned through a right angle. The land stations as far as Trimontium were left in their old direction, except Bremenium, but beyond Trimontium the right-angled turn and the necessary change from latitude to longitude and vice versa came into force. The old plotting out was kept as before in every possible case; but the twist necessitated a break in continuity somewhere. Thus a flaw in the scheme occurs at Bremenium, while the real break comes beyond those stations that should have rested on the Forth. At this stage of the map-making the discrepancy must have been alarming to any geographer.

The next change came when the map of all Britain was complete. The positions of Londinium and Caturactonium were changed by half a degree of latitude. No other explanation will suit the continual double readings in the codices and the discrepancy between the *Geography* and the *Almagest*. The resultant confusion is very great. Some stations were altered, others were left in their old positions, among which latter class was the Tay mouth. This caused the great gap between Bannatia and Horrea. But even now Ptolemy kept to his wonted methods. Multiplying the intervals between all the land-stations north of the Firth of Forth in the ratio of the difference between the old and new interval of Bannatia and Horrea, he made what he doubtless considered a brilliant reconciliation: he had kept his old triangulation and had ensured a new point of contact between north and south, the interval Coria-Colanica.³ As he might have said, the relative positions to one another of the points gained by information from other sources are found to preserve, with their relative position to the fundamental points, as near an agreement as possible with the more accurate reports of

¹ See fig. 3, A.

² It was impossible for Ptolemy to reject various bad observations for that of Πτερωτῶν στρατόπεδον. For him the Londinium observation was better (see *Geogr.*, viii, 3, 9). To follow his method in local inquiry we have worked from Londinium: the other way is logical but more confusing; its result is the same.

³ See fig. 1.

travellers. But the real point of contact between old and new had long been lost, when Scotland was first turned through a right angle. This would appear to be the best explanation of Ptolemy's procedure in mapping out Roman Scotland. There are just one or two minor points that we may note in closing.

First, as to the name of Inchtuthill, Περρωτὸν στρατόπεδον. The Latin codices all agree in giving the name *Alata Castra* as a translation of this term. We may say translation advisedly; for there is no reason to suppose that the Latin group of codices is any older than the Greek group, and neither are of great age. Müller, therefore, in his annotated edition of the *Geography*¹ makes the following conjecture. Somewhere in Scotland, and apparently beyond the Tay, the Ravenna *Chorography* mentions a place called (in the locative) *Pinnatis*.² Müller prefers to regard this as a corruption of *Pinnata Castra*, and to translate Περρωτὸν in that way. He then continues thus: "*Nomen περρωτὸν ex situ castrorum repetendum nonnulli putaverunt. In tabula codicis Constantinopolitani hoc loco pictum est castellum muris pinnatis instructum. Ac talem imaginem, nullo ascripto nomine, fortassis Ptolemæus quoque reperit in tabula quam transcripsit.*"³

What is not quite clear from this passage is whether Müller did or did not think that the term *pinnata castra*, as applied to Inchtuthill, had a very special meaning. It looks very much as if he had stumbled on the correct but idiomatic translation of Περρωτὸν without knowing its full significance.

In Cæsar's *Gallic Wars*⁴ we may read of an isolated Roman army fortifying its more or less temporary camp in expectation of a long siege: "*Turres contabulantur, pinnae loricaeque ex cratibus attexuntur.*" *Pinnae*, therefore, which is here and in another similar passage⁵ used with *loricae*, means a breastwork with parapets for fortifying ramparts which had to withstand heavy attack. *Pinnata Castra*, therefore, is the most precise and effective description of the strongly fortified legionary campaigning-base at Inchtuthill that could be conveyed in two words. Ptolemy himself, not realising the military significance of *pinnata*, or possibly copying another's mistake, translated it as Περρωτὸν, a good translation of the ordinary meaning of *pinnata*. We may therefore regard Περρωτὸν as a ghost-word, a mistaken translation of part of the original name of Inchtuthill, *Pinnata Castra*.

Lastly, a word or two as to the remaining land-stations in Scotland. In the north *Devana* and *Tuesis* are connected with the rivers that bear similar names. They lie far out beyond the pale of Roman territory in

¹ Paris, Firmin Didot, 1883.

² Edition Pinder and Parthey, v. 31, p. 435, 24.

³ *ad Ptol. Geogr.*, ii. 3, 8.

⁴ *De Bell. Gall.*, v. 40.

⁵ *Ibid.*, vii. 72.

Scotland, even at its greatest extent. We may therefore regard them as native sites. Devana, in fact, is probably perpetuated by the Pictish town Davan, in Aberdeenshire.¹ Vindogara must be regarded as another such site, unquestionably connected with the gulf of the same name below the Clyde. Carbantorigum, Lucopibia, and Rerigonium are typically native names in native lands.

Two other sites are less certainly those of native settlements. It may well be that Uxellum represents a Roman fort in the Esk valley in Dumfriesshire. But against that suggestion we may note that Ptolemy seems to have little knowledge of sites in north-western Britain. Mention of the other site, an Alauna in the land of the Otadini, is not made by the better codices. If such a site ever existed at all, we may say at once that its position gives us little help, for we have no definite material by which we might otherwise identify it. Without such external data we could not have identified Bremenium. The *Ravenna Chorography*, however, does mention an Alauna² that would seem to lie on the eastern road, and some day we may find that this was the name of a fort between Newstead and Bremenium. But in any case we shall have to wait for further evidence to prove that the name originally existed here in the Ptolemaic geography.

And now we have gained the picture of Roman Scotland in pre-Hadrianic times that Ptolemy's geometric data might have given to him. The result is on the whole an interesting confirmation of knowledge already gained. But it also brings a little new grist to the mill. It suggests an early date for two sites of which we knew, for Crichton and for the fort at the junction of the Almond and the Tay. It goes further, it provides evidence for the presence of two other sites: we learn that a fort once guarded the crossing of the Forth at Stirling; we also learn that Roman commanders thought it worth while to hold a post some way south-west of Camelon to guard the south-western flank of the Carse of Stirling. This last site has yet to be identified, for it is probably not Castlecary.³

Furthermore the map accentuates a point in strategy that was gradually becoming clear without its aid. The centre of gravity in Flavian times in Scotland did not lie on the isthmus between Forth and Clyde as in later days but rather in the Earn valley. We may observe in this connexion that the one port on the Forth at this time was Colanica. But the great port Horrea, with the military store-houses, the port which

¹ See Munro, *Prehistoric Britain*, p. 219.

² Edition Pinder and Parthey, v. 31, p. 434, 15.

³ Very little early pottery has turned up at this site; too little to suggest a longer occupation than a year or two.

everyone knew, stood on the Tay, with yet another river port, Tamia, behind it. In Antonine times we cannot yet be sure that the land beyond the isthmus was held for as long as the rest of Scotland. In any case its importance was gone: the transverse frontier line now rested on the Forth-Clyde isthmus instead of on the Earn, and two ports lay on the Forth instead of one. The frontier had moved from the gates of the Highlands to a less tenable position outside them.