Interim Report on Excavations at the Roman Fort at Brough, Derbyshire.

By I. A. Richmond, M.A., F.S.A.

INTRODUCTION.

THE Roman fort at Brough was first excavated on behalf of this Society in 1903, by Professor John Garstang. His work, described in volume XXVI of this *Journal*, identified the fort-wall, the west angle-tower and part of the principal buildings, including a well-built underground chamber, reached by stone steps. Among the relics, an inscribed stone, re-used as building material in building or repairing the cellar, attested important structural work at the fort by the First cohort of Aquitanians, under the governor Iulius Verus, about A.D. 158. These striking discoveries, however, led to no further work; and the investigation described below is an attempt to pick up the threads then dropped. A full report must await the completion of the inquiry. An interim report is justified by the fact that some stages of the inquiry are complete, and throw fresh light upon the history and structure of the fort. It is a pleasure to acknowledge much help received during the conduct of the work which was sponsored by the Society. Local arrangements and not a little staff work were the kindly care of Mr. R. W. P. Cockerton, whose interest in the whole project was the mainspring of our activity. On the actual site, we received much friendly help from Mr. F. F. Nicholson, the owner of the site, and his bailiff;

while Mr. Jesse Eyre, living close by, helped us in housing our tools. Messrs. J. P. Gillam and W. Lawson, graduates of Durham University, were in attendance throughout the excavation, and the definition of the results owes much to their careful and diligent treatment of the remains. Mr. Gillam also supervised the monotonous task of filling-in. Help was also afforded by Mr. E. Hildyard, F.S.A., who spent a week with us. Welcome visits were received from Professor Atkinson and Mr. J. A. Petch, of Manchester, Mr. Philip Corder, of the Verulam Museum, and many members of the Society and their friends.

I. THE DEFENCES (Sections I-IV).

Section I (figs. 1, 2) is a complete cross-section of the defences, taken immediately east of the west angle. It discloses the foundations of the fort-wall, 5½ feet thick, faced in hammer-dressed coursed masonry at front and back. This wall retains a massive clay bank, 25 feet thick; and the fact that bank and wall were coeval is shown by the treatment of the inner face of the wall. The coursed masonry did not begin at the bottom, as outside, but stood upon eighteen inches of rubble facing.

Eight feet in front of the wall comes a large ditch, 22 feet wide and 8 feet deep, filled with fallen debris from the wall itself. It is followed immediately by a double ditch, 20 feet wide in all, of which the inner member was 3 feet deep, the outer 2½ feet deep. By this time the zone most vulnerable to a curtain-fire of hand-thrown missiles from the wall had been reached; and twenty feet of flat ground was left here, separating the ditch-system so far described from a large outer ditch. It may be surmised that this outer ditch was not less than sixteen feet wide. But the section cuts it where it widens out to join the natural gully protecting the northward end of the site, and is thus not entirely representative in profile: similarly, it provides no section of the bank

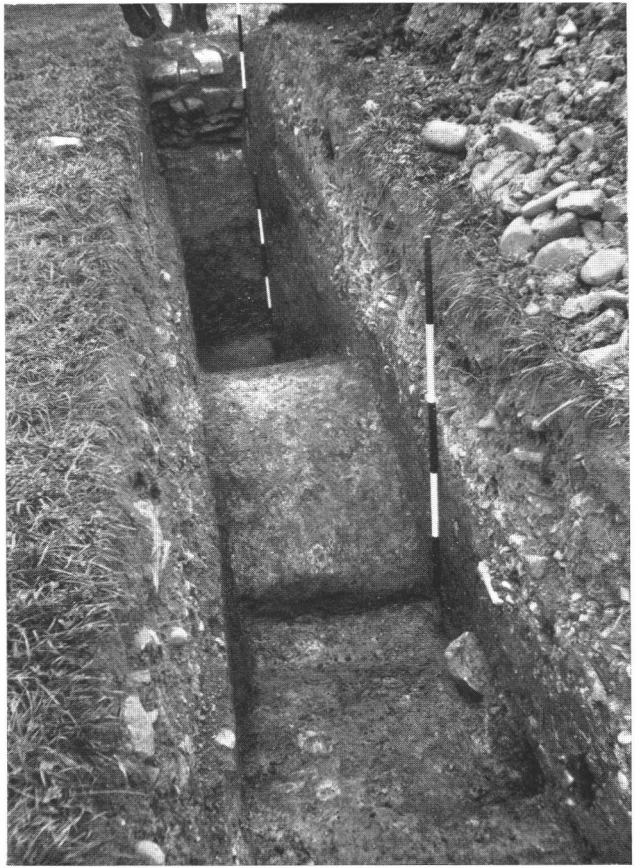

FIG. 3.—Brough: earlier ditches behind the later fort-wall.

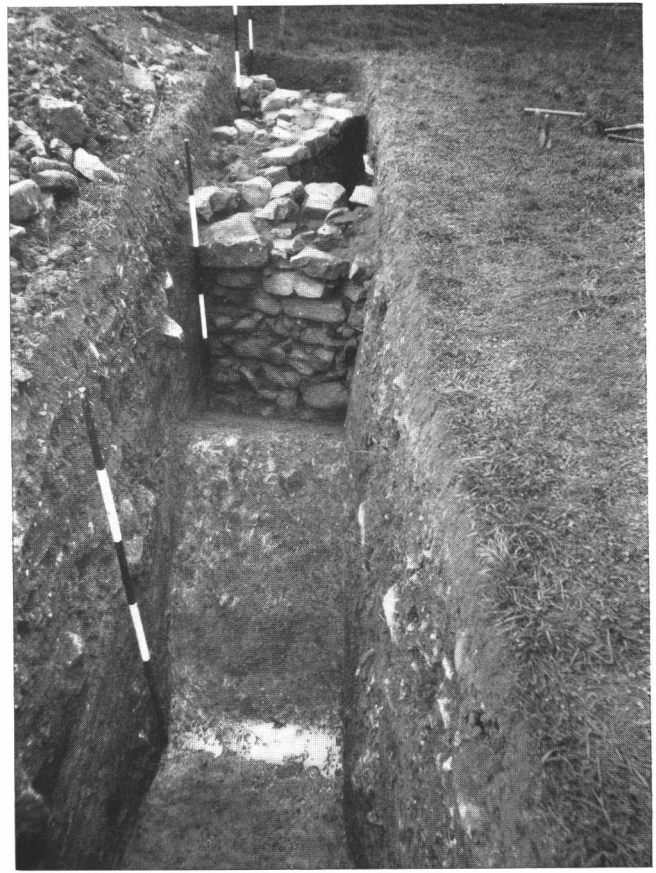

FIG. 4.—Brough: early ditches behind west angle-tower of later fort.

of upcast beyond the ditch, still visible as a gentle roll in the surface where the ditch curves southward round the angle.

The tactical arrangement of the defences is, however, quite clear. The fort-wall, not less than 15 feet high to parapet-walk (to judge from the mass of fallen material), was protected from approaching assailants by three ditches, cut without foot-hold in the slippery shale. Then followed 20 feet of no-man's land, subject to heavy curtain-fire from the fort-wall, while an outer ditch hindered escape from the trap thus prepared. Even desperate rebels would think twice before attacking this formidable centre of administration.

These sophisticated defences were not indeed the first Roman works on the site. A hint of an earlier arrangement, in fact, appears in the section already described. Immediately behind the fort wall, and underneath the clay bank, the undisturbed subsoil dips rapidly, forming a steep-sided regular excavation, filled with rammed and rather dirty blue clay. The feature does not run straight across the four-foot section, but curves fairly sharply southwards, as if it were the lip of an earlier ditch on the turn at an angle of an earlier fort. To test the question thus posed, a second section was cut behind the south-west wall of the fort.

Section II amplifies and confirms the suggestion afforded by section I. Behind the fort-wall, just over half of a V-shaped ditch is seen (fig. 3), 5 feet deep and estimated at 24 feet wide. There lies behind it a smaller ditch, 8 feet wide and 2 feet deep, including a little square channel at the bottom. Before the later clay bank was laid down on top of these ditches they were filled with very small clods of clay, peat and humus, so tightly rammed that the clods were distorted and inextricably mingled, absorbing and churning in the process a considerable amount of silt that had previously lain

undisturbed at the bottom of the ditch. The source of this mixed material cannot have been, as so often, the rampart demolished when the ditches were filled; for the mass is too broken and inconsistent ever to have formed a solid rampart. The character of the clods suggests rather, as Dr. Raistrick points out (see below, p. 61), surface strippings from ground such as that occupied by the later ditch-system.

Section III was cut across the west angle-tower, examined in 1903, so as to lay off the curve of the early ditches. It reveals (fig. 4) two ditches, as in section II, but no attempt was made to excavate the outer one. The back wall of the angle-tower, faced with three courses of hammer-dressed masonry set upon $2\frac{3}{4}$ feet of rubble, is carried down to the undisturbed subsoil once forming the side of the ditch. The desire to reach firm ground below the high tower accounts for a foundation much deeper than usual. Above the inner ditch, the clay filling at ground-level is covered by a thick deposit of ash, probably from an oven, sealed in turn by gravel, as if of a later road. No further stratification is, however, observable.

Section IV, 44 feet south of section II, fixes the direction of the early ditches on the south-west, and enables us to lay down their line. The relation of the ditches to the visible fort has also been determined in each section. They were undoubtedly earlier, and evidence for their date was to come presently from the interior.

II. THE INTERIOR.

The original choice of position for the section through the rampart defences had been determined by a desire to cut preliminary trenches only in the area where work had been done before, reserving the untouched portions of the fort until the nature of the problems presented by the site had become clear. The same consideration governed the work inside the defences.

FIG 7.—Brough: chapel of headquarters building, with underground strong-room, partly uncovered, in foreground, and foundations of curved dais in background.

FIG. 8.—Brough: chapel of headquarters building from north side, showing backward projection containing curved dais, with foundation centrally thickened for statue.

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The headquarters building. The excavations of 1903 had disclosed, in the position usually occupied in Roman forts by the headquarters, an underground chamber of a type exclusively associated with these buildings. We should expect, then, to find in connexion with it a building of the well-known pattern; in which a courtyard, often colonnaded, fronts a great hall crossing the building, while five rooms lie beyond the hall, comprising a central chapel, for the Emperor's statue and the standards of the regiment, and two pairs of rooms for administration.

The excavation of 1903, however, had revealed no such details, though it recovered the outline of a building (*Journal*, XXVI, 187, plate iii) not unlike a headquarters, yet without these typical characteristics. To inquire further into this matter, a start was made by clearing afresh the top of the underground cellar and its environment (fig. 1).

It was soon evident that stone-robbers had pillaged most of the usable stone, leaving only the remains planned in 1903. The stonework, however, had rested upon a thick layer of clay and cobbles, packed in trenches. On removing the clay from the top and the subsoil from the sides of this layer, the foundation became as clearly visible as the walling elsewhere, and a plan of the building could be obtained.

Meanwhile, the front and back walls at the west end of the cross-hall were identified, joining the side-wall of the building discovered in 1903; while a gap in the side-wall (fig 5), shown as a doorway, proved due to removal of facing-stones, behind which the core of the wall remained intact. The front and back walls of the north-western pair of administrative rooms were also uncovered, sufficiently to suggest that there had been no continuous stone partition between them.

The uncovering of clay-and-cobble foundations was now revealing (fig. 7) a chapel of the standards unusually

elaborate in plan. Space for the elaboration was gained by making the chapel jut back 13 feet beyond the main building, and was used to contain a raised dais—four paving-stones remained in position—with curved front wall of niche-like form, thickened in the middle towards the back so as to carry a (fig. 8) heavy object, probably an Imperial statue. This feature evidently determined the axis of the room, and thus shows in addition that the steps leading to the underground cellar had been centrally placed, as often elsewhere. Thus, the headquarters at Brough, while in general corresponding to the normal type, contain at least one feature of exceptional interest, and it is highly desirable that further work should be done to elucidate the plan completely. In skilled hands, this should be possible at relatively little expense.

Other buildings. The single wall noted in sections II and IV (fig. 1) represents the first building inside the south-west rampart of the fort. This will have been a barrack or stable, some 120 feet long.

The two trenches cut between the headquarters building and the north-west rampart revealed a series of walls, more numerous than hitherto recorded, belonging to an irregular building, which analogy would suggest to be either the commandant's house or workshops. Until further work has been done, nothing useful can here be reported; but it should be observed that the floors of these buildings had been entirely removed, together with all stratified material. The buildings lie on the very crown of the plateau and have suffered most from stone-robbing and ploughing.

A further discovery, however, was to show how the scant cover at this point may yet be turned to considerable advantage. The first pair of walls north of the head-quarters building had not been founded directly upon the subsoil, a fact which no doubt accounts for the depth and

solidity of the foundations. The subsoil was covered by a spread of fairly clean tough clay, from a foot to eighteen inches thick containing potsherds. This layer sealed an earlier occupation-level, resting immediately upon the subsoil. Trenching revealed (fig. 6) structures, an open stone drain, V-shaped in section, two little cooking-hearths (shallow rectangular pits filled with burnt stones and ashes) and behind these the foundation-trench, 9 inches square in section, for a horizontal wooden beam. These remains represent a timber building with a verandah in which cooking was done and from which the eaves-drippings were carried away in an open drain. This suggests a barrack, of the type some 30 feet wide and 120 feet long, where the soldiers regularly did their cooking in the open verandah, saving their rooms from smoke and their building from danger of conflagration. The date of the building is roughly given by the sherds contained in the clay spread above it when it was demolished. These include a carinated bowl, a mortarium with wide flat rim and two fragments of rustic ware, all current during the period A.D. 80-110. This shows that the building belongs to the early fort, and may be brought into connexion with its ditches (fig. 1). When this is done, it appears that some eighty feet separates the verandah from the inner ditch. This allows space for a rampart about 30 feet wide and a space of 50 feet between it and the buildings, dimensions completely in harmony with Roman practice. What, then, has happened to the rampart? Sections I, II and IV, crossing its position, shows that it was demolished so thoroughly as to leave no trace behind. The material from it, however, was not used to fill the ditches; and suspicion therefore attaches to the spread of tough clay covering the untidy remains of the earlier occupation, and providing a *tabula rasa* on which the builders of the later fort could work. What source could provide this material more conveniently

than the early rampart? And would not this supposition explain why nothing was left for filling the early ditches except the strippings from the line then being prepared for the later ditch-system?

To ask some questions is to suggest an answer. Others remain which only further excavation can solve. No accurate date is yet assignable to the later fort. Relics recovered from the ditches attest an occupation covering the second half of the second century. A silver *denarius* of Severus, A.D. 193-210, from the headquarters building, suggests a continuation of that occupation into the third century. But scattered remains do not make up for the lack of stratified material. This may be expected to occur lower down the slope, where more cover is available, while the lack of cover on the crown of the plateau will enable the plan of the earlier buildings to be quickly gained at little expense. Production of a definitive report depends upon further work in both areas.

A more specialised matter deserves a final word. The report here written has been purposely couched in simple terms, in order to render it acceptable to those who are not specialists in the subject. But the actual conduct of an excavation involves much specialism, in surveying, photography and analysis of the results. Two sets of material here require reports more elaborate than the general account which would not have been available except for the generous help of colleagues. The analysis of the ditch-filling is due to Dr. A. Raistrick. Some lead ore, indicative of the close relationship between the fort and adjacent minerals, has received detailed attention from Dr. J. A. Smythe. Their reports follow this one, as two appendices.

APPENDIX I.

REPORT UPON SAMPLES OF FILLING FROM DITCHES IN SECTION II, AT BROUGH, DERBYSHIRE. By A. Raistrick, M.Sc., Ph.D.

Inner ditch. The upper part of this material is a mass of peaty turf, not *in situ*, as shown by the bedding, which is broken and turned in all directions. The lower part is a filling of earth, clay, stones and shale, churned up in a matrix of grey silt, which has squeezed in all directions. Stones and pieces of shale stand in all possible positions in relation to their bedding planes. It appears most like what would be the result of casting site cleanings and soil strippings into a ditch containing a few inches of silt, and then trampling or ramming the whole mass.

Outer ditch, upper material. This is a conglomerate of small clay lumps, silt, sand and gravelly patches, and fragments of turf, and many clods of dried mud. It has been tipped down a slope, as shown by the marked bedding and lines of sandy silt. It resembles typical cleanings or sweepings from a trampled clay site.

Outer ditch, lower material. The upper part of this material is a fine grey-brown,slightly calcareous silt with embedded lumps of peat and clay. The clay lumps are rounded balls of white clay, brown pebbly boulder-clay and blue shaly clay. The peat is well matured, tough and very free from silt of any kind.

The lower part is similar lumpy filling, pounded into the silt. Towards the bottom is a considerable thickness of sphagnum, forming a separation-layer, below which is a churned mass of shale, silt, boulder-clay and gravel, with bits of peat and sphagnum in it. Again, it appears that a silt with sphagnum top layer has been churned up before and during the process of tipping and pounding the upper filling.

APPENDIX II.

ROMAN GALENA FROM BROUGH, AND ROMAN LEAD FROM DERBYSHIRE. By J. A. Smythe, D.Sc., Ph.D.

Seven unstratified samples of galena (A-G, below) from Brough, supplied by Mr. I. A. Richmond, and two samples (H and I, below) from outside the north-east gate of the same fort, supplied by Mr. J. P. Gillam, have been examined. Opportunity is taken, in the description of these, to add some notes on Roman lead from Derbyshire in general.

i. *Galena.* To prepare the samples for analysis, they were broken and hand-picked, to remove spar and scale. No particular

concentration, by fine powdering, washing and panning, was sought. In spite of this, the lead content is invariably high, in some cases approaching the maximum for galena, namely, 86.6 per cent.

The results of the lead and silver assays, with some notes on the specimens themselves, may be tabulated as follows:—

	Lead in the ore per cent.	Silver in the lead 02 dwts.	Wt. of specimen grams	Notes.
A	81.0	0–8.5	46	Rounded, pebble-like; much cracked and corroded; encrusted with carbonate and sulphate of lead: contain a little metallic lead.
B	78.3	0–14.7	34	
C	79.7	0–18.0	12	Rounded pebble, encrusted in the carbonate of lead.
D	73.3	0–10.1	15	Broken fragment, fresh: with barytes.
E	81.0	0–8.2	20	Ditto: with fluorspar.
F	77.8	0–12.4	18	Ditto: with barytes and fluorspar.
G	74.2	0–7.4	32	Ditto: with carbonated crust.
H	76.5	1–12.5	55	Roundish lumps, encrusted with spar: mainly barytes, but with some fluorspar.
I	78.0	1–8.8	60	

Three of the specimens, A, B and C, are well rounded and have all the appearance of pebbles (float ore). A and B have been heated, up to the point where chemical action takes place, as is evident from their cracked condition; from the presence of lead sulphate (obviously not the mineral anglesite, but rather the compound formed by the oxidation of galena, or by heating in air); and, especially, from the presence of metallic lead, which shows up as " metallics " of malleable lead on crushing the ore.

The spars commonly occurring with the lead ore in Derbyshire, namely barytes and fluorspar, are present in samples D, E, F, H and I. The last two of these, though rounded, are probably not pebbles, for galena often occurs in roundish lumps in sparry veins. A, B and C, however, appear to be true pebbles.

These observations, so far as they go, indicate that the Romans used pebbles of ore from the streams as well as ore mined from rakes or veins, as a source of lead. Further, the fact that two

of the samples, A and B, contain metallic lead, may be regarded as proof that they actually smelted lead in the locality. This reinforces the evidence afforded by lead pigs, and is of value since remains of smelting furnaces have not yet been recorded.

As to the silver content of lead reduced from the ores, expressed in Troy ounces and pennyweights (20 to the oz. troy) per long ton (2,240 lbs. avoirdupois) of the lead-silver alloy or "work-lead", it will be noted that this is uniformly small, varying from 0.5 to 1.5 ounces of silver per ton of lead. This would almost certainly be too small, even in Roman days, to repay extraction. In the heyday of lead smelting in Derbyshire, the silver was seldom recovered. Thus, Dr. Watson (*Chemical Essays*, 1787 (4th edn.), p. 314, states that "there is not at present any place in Derbyshire where silver is extracted from lead"; while John Farey (*General View of the Agriculture and Minerals of Derbyshire*, 1811, i, 407-8) observes of silver that "formerly it was refined or parted from lead, particularly that from Ball Eye mine in Bonsall; but long since the practice has been wholly discontinued, on account of the great waste of lead and the expense of the processes." It is significant that in Farey's list of two hundred and eighty-seven Derbyshire lead-mines, in which many particulars of the ores are given, there is only one mention of silver as the constituent, and that is the case of the Ball Eye mine. H. L. Pattinson, inventor of the first process for desilverisation of work-lead—for the ancient process of recovering the silver by cupellation (Pliny, *Nat. Hist.* xxxiii, 31) is not, strictly speaking, a desilverisation process—estimated the average silver content of Derbyshire lead at 1 to 1.5 oz. per ton (*Brit. Ass. Report*, 1838, p. 50). Lead from Derbyshire at the present day does not contain more than one ounce of silver per ton.

Altogether, then, the Derbyshire ores are, and have been over long modern periods, very poor in silver; and, with very few exceptions, have not been worth desilverising. The evidence supplied by the examination of these galenas, of Roman date, lends no support to the view, sometimes expressed, that the ancient ores were richer in silver than the modern ones.

ii. *Lead pigs.* Six Roman lead pigs from Derbyshire are preserved, and all have been assayed for silver, some by Gowland (*Archæologia*, lvii, 359ff.) and some by myself. The list of these, with Gowland's numbers, is as follows:—

Silver.

1. IMP. CAES. HADRIANI. AVG. MET.
   LVT. Cromford Moor, Wirksworth. 1 oz. 19.5 dwt.
2. L. ARVCONI. VERECVNDI. METAL.
   LVTVD. Matlock Bank. 1 oz. 5.6 dwt.
3. P. RVBRI. ABASCANTI. METAL.
   LVTVDAR. Tansley Moor, Matlock. 16.3 dwt.
4. C. IVL. PROTI. BRIT. LVT. EX. ARG.
   Hexgrave Park, Mansfield. 2 oz. 13.2 dwt.
5. C. IVL. PROTI. BRIT. LVT. EX. ARG.
   South Cave, Brough, Yorks. 2 oz. 13.4 dwt.
6. TI. CL. TR. LVT. BR. EX. ARG.
   Pulborough, Sussex. 1 oz. 2.2 dwt.

The final phrase in nos. 4, 5 and 6, compared with nos. 1, 2 and 3, raises difficulties. EX. ARG. is usually taken to have reference to desilverisation. But, when the average value of the silver is 1.75 oz., with extremes of roughly 0.75 oz. and 2.5 oz., there is nothing to suggest desilverization, in view of the content of Derbyshire ores; nor does anything suggest that these pigs are other than work-lead, the immediate product of smelting ore. Pig leads, almost certainly desilverised, from Flintshire contain about 0.5 oz. of silver, while the contents of others from Somersetshire are as low as 3 to 5 dwts. of silver per ton. Again, as Gowland noted long ago, two of the pigs marked EX. ARG. have the highest silver content. One can only conclude that, so far as Derbyshire at least is concerned, EX. ARG., whatever its true expansion, has no reference to desilverisation.

iii. *Wrought leads.* By this term is meant leads which have been worked for use. I have assayed fifteen samples of them found in Derbyshire for silver; nine were samples of sheet lead, three were spindle-whorls, one was a small cone, one a rod, and one a shapeless mass. The silver content of nine of them ranges from 0.5 to 1.25 oz.; and of the remaining six, from 1.75 to 2.75 oz.

Summing up now the situation with respect to silver in lead, we have information from thirty assays. The results are as follows:—

15 wrought leads: silver content, 0.5 to 2.75 oz. per ton.
9 galena leads: silver content, 0.5 to 1.5 oz. per ton.
6 pig leads: silver content, 1.0 to 2.5 oz. per ton.

There is thus no evidence that the Derbyshire ores used by the Romans were richer in silver than those wrought within the last

two centuries. Actually, they appear poorer, but that is probably due to the imperfection of the record. There is, of course, always the possibility that the Romans may have found one of the rare, rich ores, like that of the Ball Eye mine, and that they extracted the silver from the lead smelted from this ore. But there is nothing to indicate that this happened. Indeed, it is very doubtful whether they extracted silver from the ordinary run of their leads, since these are so poor in silver, and since extraction in those days involved the cupellation of the whole of the lead-silver alloy, with the consequent laborious reduction of the resultant litharge, in order to recover the lead. The bearing of these conclusions upon the meaning of the abbreviated phrase EX. ARG. has already been indicated; but it will be understood that the full discussion of this problem involves the consideration of much evidence from the other mining fields of Somerset, Salop, Yorkshire and Flint. This is beyond the scope of the present note.