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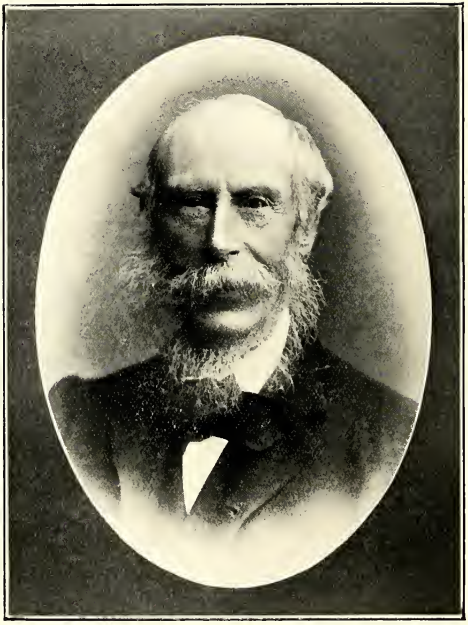
Hudleston, W. H.
A history of the Dove family

Charles Johnson
23 July 1910

The
Dove Marine Laboratory,
Cullercoats.



WILFRID HUDLESTON HUDLESTON,

M.A., F.R.S., F.G.S.

(BY PERMISSION OF THE ROYAL SOCIETY.)

A

History of the Dove Family

AND

THEIR DESCENDANTS

IN

CONNECTION WITH CULLERCOATS,

NORTHUMBERLAND,

BY

W. H. HUDLESTON.

AN

ACCOUNT OF

The Dove Marine Laboratory

AND ITS STRUCTURAL DETAILS,

BY

J. J. LISH.

AND THE

History and Purposes of the Laboratory,

BY

PROFESSOR A. MEEK.

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PREFACE.

The present volume is intended to commemorate the erection of the Dove Marine Laboratory in Cullercoats Haven.

A one-storey wooden erection, about thirty feet long by ten feet wide, placed against the south end of the old Salt Water Baths in that place, had been utilized by the Armstrong College for the study of Marine Zoology, with special reference to the development and improvement of the local fishing industry, which erection was gutted by fire on March 28th, 1904.

The representatives of the College, in 1906, approached Mr. W. H. Hudleston, the owner of the site, as to the construction of a new and more suitable Laboratory. Mr. Hudleston thereupon offered to build, at his own cost, an entirely new and permanent structure, properly adapted throughout for this important branch of the scientific work of the Armstrong College. This negotiation was followed by the construction of a new and substantial quay wall, the preparation of the site for, and the erection of, the new building; and the Institution was officially opened by His Grace the Duke of Northumberland, on the 29th of September, 1908.

Mr. Hudleston was a descendant of the Doves of Cullercoats, whose name is intended to be commemorated in the title of the building as "The Dove Marine Laboratory."

In the following pages:—

(1) Mr. W. H. Hudleston writes on the history of the Dove family and their descendants in connection with Cullercoats.

(2) Professor A. Meek, Armstrong College [Director of the Laboratory], writes on the scientific history and objects of the Laboratory.

(3) The Architect, Mr. J. J. Lish, Newcastle-upon-Tyne [Past President of The Society of Architects (London)], writes on the architectural aspect and structural details of the building.

The lamented death of Mr. Hudleston, before the sheets could be sent to the press, will be found duly recorded in the obituary appended.

To his successor, Mr. William Simpson, M.R.C.S., the editor owes the completion of the volume in accordance with Mr. Hudleston's wishes.

Acknowledgments on behalf of the late Mr. Hudleston and the present writer for information received for this volume, and for assistance in the work, are gratefully tendered to Mr. W. W. Tomlinson, Mr. Maberly Phillips, Mr. R. Oliver Heslop, Mr. Richard Welford, Mr. H. H. E. Craster, and Mr. W. H. Ryott.

The engravings executed by John Bale, Sons, & Danielsson, Ltd., Great Titchfield Street, London, are chiefly from photographs by O. Hingley, Cullercoats, and G. Adams, Whitley Bay, and from plans and sketches by the Architect.

"Cullercoats in the early years of the nineteenth century," is from an engraving of T. M. Richardson's well known picture, and "Cullercoats in the Forties," from an engraving by George Finlay Robinson, an artist and engraver of Newcastle-upon-Tyne, which appeared in the "Handbook to Tynemouth and the Blyth and Tyne Railway" (1863), by Richard Welford.

The portraits of the Rev. Curwen Hudleston, and Eleanor Dove, are from paintings now in the Laboratory at Cullercoats: that of Mr. Hudleston is from a recent photograph.

For many years Mr. Hudleston had contemplated leaving some permanent record of the connection of the Doves with Cullercoats, and the present work, descriptive of the new Marine Laboratory, the scientific objects intimately associated therewith, and some notice of the Doves as residents and land owners in the locality, may, it is hoped, form some permanent record of that family, and at the same time, be a fitting tribute to, and a memorial, not unworthy, of the principal author, Mr. Hudleston, whose life was never lacking in energy and interest.

J. J. Lish,

Fencote, Fenham,

Newcastle-upon-Tyne.

May, 1910.

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From a Picture by T. M. Richardson.

On the high ground to the left is Fisher Row, a range of one-story cottages, the site of which is now occupied by Victoria Crescent. To the right of this is the Old Ship Inn block, the Old Square, Dial House, etc., and beyond these in the dip between the Cliffs, is seen the outfall of "Marden Burn"; still further to the right hand, on the bold headland running out into the North Sea, the Cullercoats Wireless Telegraph Station is now located, and the Salt Water Baths are seen down on the foreshore, below Fisher Row.

THE

Dove Marine Laboratory,

CULLERCOATS,

NORTHUMBERLAND.

The History of the Dove Family and their Descendants in Connection with Cullercoats.

By W. H. HUDLESTON.

The story of the Doves has been well told by many writers of recent years. Among these works I may especially mention *Historical Notes on Cullercoats, Whitley and Monkseaton*, by Mr. W. W. Tomlinson; *History of Northumberland* (vol. viii.); *The Parish of Tynemouth*, by Mr. H. H. E. Craster; and certain papers in the *Archæologia Æliana*, by Mr. Maberly Phillips. A substantial foundation for much of this family history was afforded by the title deeds, now in my possession, which were abstracted and annotated by my father towards the middle of the nineteenth century. Since those days I have had an opportunity for further investigating these title deeds, although there is very little additional matter of real importance to be gathered from them.

Early History of the District and Possible Origin of the Name Dove, as Applied to a Family.

Since Cullercoats must be regarded as a village of comparatively recent origin, certainly not more than 300 years old, we must turn to the records of Whitley, where, including Tynemouth and Monkseaton, we first come across the family name of Dove, apparently not earlier than the sixteenth century. The records go back to the reigns of Richard I. and John. Six generations of the principal personage are enumerated: 1, Ralph de Whitley. 2, Henry de Whitley. 3, John de Whitley (mentioned in 1290 and also in 1297, when the country was harried by the Scots under Wallace). 4, Gilbert de Whitley (in 1345 licensed to crenellate his manor house). 5, John de Whitley, buried at St. Albans. 6, Agnes de Whitley (married to William Parker, and buried at St. Albans).

The above represents a period when the principal person in the district took his name from that district, and hence the origin of many "place-names." In 1296 a roll relating to Northumberland contains a list of the tenants at Whitley as follows: Roger Gray, William Brun, William de Brerden, Ralph Averay, Nicholas de Whitley, Agnes, the widow, Gilbert de Whitley, Eleonore, the widow. In 1321, besides "place-names," we find Henry Fawcus, Robert Sauvage, William Parker, etc. In 1403 occur the names of John Olyver, Thomas Thornborough, William Parker and William Assh.

There is next a hiatus of 136 years, and during that interval the family name of Dove must somehow have originated, or, at least, come to the front, since we find that in 1539, on the suppression of the monasteries, Robert Dove, the collector at Whitley, accounts for £8. 6s. 8d., being the rent of five copyhold tenants. This is probably the same Robert Dove who is also

described as the miller of Marden, and, so far as I know at present, he is the first person bearing the name of Dove who appears on the records.

As collateral evidence it is mentioned that a dovecot on the north side of the village (? of Whitley) has given its name to Dovecot Close, the building being described in 1634 as then in a decayed condition. Whether this really had anything to do with the family name of Dove is very uncertain. That the name has some connection with the bird seems highly probable, and the owner of the dovecot may ultimately have acquired the name of Dove. It is unfortunate that so much is left to conjecture, but it is at least a curious coincidence that the name of Cullercoats is thought by some to be derived from the Anglo-Saxon "culfre-cotes," *i.e.*, dove-cotes. We will consider this point subsequently in relation to that village.

The Early History of Cullercoats.

It has been clearly pointed out by Mr. Tomlinson that this village is of no great antiquity. "Cullercoats," he observes, "does not appear in Speede's map of Northumberland, which was published in 1610, though Whitley, Monkseaton, Hartley, Earsdon and other villages in the neighbourhood are duly indicated. Even as late as 1654 the place was of so little importance that it is omitted from Hollar's map of the Tyne." According to the same author, sometime between 1681 and 1688, Captain Grenvile Collins in the yacht "Merlin" made a survey of the coasts of the Kingdom. "In the chart of the Tyne and the adjacent coast published separately in 1685, 'Collar coates' and 'Whitley Pitts' are noted as prominent landmarks, and the former is thus described:—'Is a Pier that lieth a mile or more from Tinmouth Castle to the northward, and is a Pier where vessels enter at high water to load coals, and lie dry at low water. The going in of this place is between several rocks.'"

From the above extracts it would appear that Cullercoats sprang into existence as a village and port of some consequence between the years 1654,* or thereabouts, and 1685. The reasons for this sudden appearance of a new place on the Northumberland coast are partly explained by the documentary history of the neighbourhood. There exist three deeds which are of especial value in this connection, as supplying us with some account of what was subsequently termed "Cullercoats," though spelt in very different ways, very early in the seventeenth century. In the year following the famous Gunpowder Plot, namely, on the 9th July, 1606, there was a deed of sale by Ralph Delavale of Tinemouth, gentleman, to his brother Peter Delavale of Tinemouth, gentleman, for £6 of two parts of a close, divided into three, called Arnold's Close in "le lordesmarsh," being between the late prior's land on the west as far as the river Mordeane as it runs into the sea on the north and as the shore of the sea leads to the land of Christopher Welden and so to the land of the late prior, called "Couller Comers," on the south side. Subjoined is the original Latin text with translation.†

RALFE DELAVALE'S SURRENDER FOR ARNOULDS CLOSSE, 9 JULII, 1606.

Omnibus Christi fidelibus ad quos hoc presens scriptum pervenerit, Radulfus Delavale de Tinemouth Sheeles in comitatu Northumbrie, generosus, salutem in domino sempiternam. Sciatis me prefatum Radulfum Delavale pro et in consideracione sex librarum bone et legalis monete Anglie mihi prefato Radulfo Delavale per dilectum fratrem meum Petrum Delavale de Tinemouth in comitatu predicto, generosum, pre manibus bene et fideliter

To all faithful in Christ to whom this present writing shall come, Ralfe Delavale of Tinemouth Sheeles in the county of Northumberland, gentleman, greeting in the Lord for ever. Know that I, the aforesaid Ralfe Delavale, for and in consideration of six pounds of good and lawful money of England to me, the aforesaid Ralfe Delavale, by my beloved brother Peter Delavale of Tinemouth in the county aforesaid, gentleman, in hand well and truly

* See footnote, p. 25.

† I am indebted to Mr. Charles Johnson of the Public Record Office for reading and translating this deed.—W.H.H.

solutarum, unde fateor me fore satisfactum et persolutum dictumque Petrum Delavale, heredes et executores suos inde esse acquietatos et exoneratos imperpetuum per presentes. Dedisse, concessisse, vendidisse, barganizasse, et hoc scripto meo confirmasse prefato Petro Delavale totas illas duas partes clausure in tres divise vocate Arnolds Close, cum pertinenciis sicut jacentes et existentes in Le Lordesmarshe inter terram nuper prioris ex parte occidentali usque ad rivulum vocatum Meeredeane, sicut rivulus currit in mare ex parte boreali et sicut littus maris ducit ad terram cujusdam Christoferi Welden et sic ad terram dicti nuper prioris vocatum Couller Comers ex australi parte per suas rectas metas et boundas, cum omnibus et singulis terris, tenementis, pratis, pascuis, pasturis, aquis et cursibus aquarum, comoditatibus, proficuis, viis, semitis, easiamentis, emolumentis, redditibus, serviciis et hereditamentis quibuscumque eisdem duabus partibus clausure predicte spectantibus aut aliqualiter pertinentibus. Que omnia et singula premissa nuper fuerunt terre, possessiones et hereditamenta Wilhelmi Follensby et Petri Maddison, generosorum, et quae omnia dicta premissa prefatus Radulfus Delevale perquisivit et habuit sibi et heredibus suis imperpetuum ex dono, concessione et feoffamento quorumdam Thomae Bone, Jacobi Robinson et Agnetis Robinson de Tinemouth, viduae. Habendum et tenendum dictas duas partes clausure predicte et cetera premissa, cum omnibus et singulis pertinenciis suis quibuscumque, tam viis

paid, whereof I confess myself to be satisfied and paid, and the said Peter Delavale, his heirs and executors thereof to be quit and discharged for ever by the presents. Have given, granted, sold, bargained, and by this my writing have confirmed to the aforesaid Peter Delavale all those two parts of a close in three divided called Arnolds Close, with its appurtenances as lying and being in Le Lordesmarshe between the land of the late prior on the west side as far as the brook called Meeredeane, as the brook runs into the sea on the north side and so as the shore of the sea leads to the land of one Christopher Welden and so to the land of the said late prior called Couller Comers on the south side by its right metes and bounds, with all and singular lands, tenements, meadows, leasowes, pastures, waters and watercourses, commodities, profits, ways, paths, easements, emoluments, rents, services and hereditaments whatsoever to the same two parts of the Close aforesaid belonging or anywise pertaining. Which all and singular premises lately were the lands, possessions and hereditaments of William Follensby and Peter Maddison, gentlemen, and all which said premises the aforesaid Ralf Delavale purchased and had to him and his heirs forever of the gift, grant and feoffment of certain Thomas Bone, James Robinson and Agnes Robinson of Tinemouth, widow. To have and to hold the said two parts of the Close aforesaid and the other premises, with all and singular their appurtenances whatsoever, as well ways as paths, to the aforesaid

quam semitis, prefato Petro Delavale, generoso, heredibus et assignatis suis, ad solum opus et usum ipsius Petri Delavale, heredum et assignatorum suorum imperpetuum. Tenenda de capitalibus dominis feodi illius per servicium inde prius debitum et de jure consuetum. Et ego vero prefatus Radulfus Delavale et heredes mei totas predictas duas partes clausure predictae et cetera premissa, cum pertinenciis suis praedictis, praefato Petro Delavale, heredibus et assignatis suis imperpetuum ad opus et usum predictum contra omnes gentes warrantizabimus et per presentes defendemus. Et ulterius sciatis me prefatum Radulfum Delavale fecisse, ordinasse, constituisse et in loco meo posuisse dilectos mihi in Christo, Rogerum Mooreton et Thomam Watson de Tinemouth, yeomen, meos veros legittimos et indubitatos atturnatos, conjunctim et divisim ad intrandum pro me vice et nomine meo de et in predictis duabus partibus clausure predicte cum pertinenciis et possessionem inde capiendam. Et post hujusmodi possessionem et seisinam sic captam et habitam deinde pro me vice et nomine meo plenam et pacificam possessionem et seisinam legalem de et in premissis vel in aliqua inde parcella nomine omnium premissorum prefato Petro Delavale aut suo in hac parte atturnato secundum vim, formam, tenorem et effectum hujus presentis scripti mei inde confecti ulterius deliberandam. Ratum et gratum habens et habiturus totum et quicquid dicti atturnati mei nomine meo fecerint seu alter eorum fecerit in premissis vel in aliquo pre-

Peter Delavale, gentleman, his heirs and assigns, to the sole use and behoof of the same Peter Delavale, his heirs and assigns for ever. To hold of the chief lords of that fee by service therefor heretofore due and of right accustomed. And I (indeed), the aforesaid Ralfe Delavale, and my heirs all the aforesaid two parts of the Close aforesaid and the other premises, with their appurtenances aforesaid, to the aforesaid Peter Delavale, his heirs and assigns for ever to the use and behoof aforesaid against all people will warrant and by the presents will defend. And furthermore know that I the aforesaid Ralf Delavale have made, ordained, constituted, and in my place put my well beloved in Christ, Roger Mooreton and Thomas Watson of Tinemouth, yeomen, my true lawful and undoubted attorneys, jointly and severally to enter for me in my place and name upon and into the aforesaid two parts of the Close aforesaid with its appurtenances and possession thereof to take. And after such possession and seisin so taken and had then for me in my place and name full and peaceful possession and lawful seisin of and in the premises or in any parcel thereof in the name of all the premisses to the aforesaid Peter Delavale or his in this part attorney according to the force, form, tenor and effect of this my present writing thereof made further to deliver. Ratifying and approving and being to ratify and approve all and whatsoever the said my attorneys in my name shall do or one of them shall do in the premises or in any of the prem-

missorum per presentes. In cujus rei testimonium ego prefatus Radulfus Delavale huic presenti scripto meo sigillum meum apposui. Datum nono die Julii, anno regni domini nostri Jacobi, Dei gratia Anglie, Frauncie et Hibernie regis, fidei defensoris, et cetera quarto Scotiaeque XXXIX^mo. Anno domini, 1606.

Signatum, sigillatum et deliberatum in presentia
[Witnesses' names missing]
Ralfe Delavale.

ises by these presents. In witness whereof I, the aforesaid Ralf Delavale, to this my present writing my seal have set. Given on the 9th day of July, in the year of the reign of our Lord James, by the Grace of God of England, France and Ireland King, Defender of the Faith, etc., fourth and of Scotland 39th. A.D. 1606.

Signed, sealed and delivered in the presence of
[Witnesses' names missing]
Ralfe Delavale.

The chief point to notice here is that the area conveyed in this and the two subsequent deeds was then known as Arnold's Close. "The boundaries of this close," Mr. Tomlinson says, "are precisely those of the present manor and township of Cullercoats."* This is probably true, though the deed itself does not specify the extent of the area conveyed. There were few, if any, tenements at that time on the premises, which contained the site of the future village of Cullercoats, most of the building sites having been leased or sold by members of the Dove family in after times. By gradual alienation in this way a considerable portion of Arnold's Close passed into other hands, but the name of Arnold's Close was preserved, and at the death

* Mr. Craster in his *History of Tynemouth Parish*, p. 280, observes that "the north-east corner of what was formerly Tynemouth township constitutes a separate poor law township, and forms the village of Cullercoats. It lies by the sea-shore on the south side of the Marden burn, is bounded by John Street on the west, comprizes an area of fifteen acres, and in 1901 had a population of 1,743. Coal was worked here in 1315, when the workings were destroyed in a Scottish invasion."

This last sentence is an ambiguous one, since many people would imagine that Cullercoats was in existence in the reign of Edward II. It is important, therefore, to know that the writer refers to Marden and not to Cullercoats in his quotation from the Tynemouth Chartulary. No such name as Cullercoats, or any of its numerous equivalents, appear in ancient deeds for a long time subsequent to the period in question.

of the late Andrew Hudleston, D.D., in 1851, the residuum consisted of a field of about seven acres, still known by that designation. This was subsequently laid out for building, and the present Hudleston Street runs pretty nearly through the centre of it.

But we are anticipating and must revert to the original transaction between the brothers Delavale for further information respecting the future Cullercoats. The western boundary of Arnold's Close is rather vague, but that on the north is clear enough, since the Marden Burn forms an excellent line of demarcation as far as the sea. The "dene" or hollow in which this stream once flowed was partly answerable for the name it bore. The sea on the east is also a distinct boundary, but on the south there is a want of definition. Yet here a point of some interest should be noted— "and so to the land of the late prior's called 'Coulter Comers'* on the south." If this curious word is the origin of "Cullercoats" it is clear that the land so described is not part of the land included in the deed of sale, but lay to the south of it. In the deed of 15th March, 1618, between John Delavale of Tynemouth, gentleman, and Thomas Wrangham of North Shields, yeoman, relating to Arnold's Close, it would appear that a further portion towards the south-east had been acquired, and the boundary in this direction is now defined as "upon a gutter or sworle towards the south-east." This in point of fact represents the present boundary of the property, where there is a slight depression in the sandstone-rock a few yards to the south-east of the quay wall supporting the Marine Laboratory. It should be noticed, moreover, that in this deed the name of Cullercoats does not appear.

The principal point for consideration is the origin of the

* There seems to be a doubt as to whether this should read "Coulter Corners" or "Comers."

term "Cullercoats;" and if I have interpreted these deeds correctly, that name has nothing to do with Arnold's Close, on which nearly the whole of Cullercoats, both old and new, has been built. The name seems to have been originally applied to the sandstone cliffs which bound the south-east of Cullercoats Bay and which form part of the picturesque mass of Permian rocks lying on the north side of the Ninety-fathom Dyke. These yellow false-bedded sandstones are particularly well developed immediately to the south of the Marine Laboratory, where they are said to be penetrated by a cave of some extent. These same rocks are still better developed in the bold headland which protects the bay of Cullercoats on the south and which contains the famous Smugglers' Cave painted by Richardson, and reproduced in Tomlinson's book (p. 76). If the prefix "Culler" or "Culver" has anything to do with pigeons, as its etymology certainly indicates, this is just the place to seek for an explanation of the term.* When man was less mischievous than he is at the present day and guns were scarce, it is quite possible to believe that these caves and ledges in the rough Permian sandstone were frequented by rock doves, just as the caves in the rocks of the Farne Islands are (or used to be within a recent period) at the present day. This bird, *Columba livia*, is the origin of our domestic pigeon and doubtless was common in rocky places along the coasts of England, as it was until very recently in many of the more remote parts of the Scotch coast.†

* It is still a matter of uncertainty in what document Cullercoats, or its etymological equivalent, *first* appears. We have already seen that the notice in Craster's *History of Tynemouth Parish* refers to Marden and not to Cullercoats. Mr. Craster considers that the earliest mention of *Culvercoats*, and then only as a field name, occurs in a late Elizabethan survey or rental of Tynemouthshire, which cannot be exactly dated, but which was made *circa* A.D. 1600.—W.H.H. (See footnote, p. 25.)

† In some parts of the south of England the word "Culver" may be traced, as in Culverden, a place in Oatlands Park, Surrey, which means "The Pigeon's Hollow," in this case the wood pigeon, or *Columba palumbus*.

First Connection of the Doves with Cullercoats.

Having hitherto endeavoured to throw some light on the origin of the name *Dove* and also on that of *Cullercoats*, each of them by a singular coincidence associated with the idea of a pigeon, it is time now to follow out the connection of the Dove family with the property ultimately known as Cullercoats. There can be no doubt that the Dove family had multiplied and flourished exceedingly since we first heard of them about the period of the suppression of the monasteries (1539). At that time Robert Dove, the Whitley collector, worked a windmill at Tinmouth, and a water-mill at Marden, which latter bordered on Arnold's Close. Those who know the state of the Marden burn at the present day will be rather surprised that its feeble stream could be utilized as a source of power. But it is clear that this was effected by means of dams, one of which is incidentally mentioned in a subsequent deed in connection with the "waggon way" presently to be described. Owing to modern drainage, it requires a good thunderstorm nowadays to make any show of water in the Marden valley. It is not quite clear where this mill was situated, but as there is no mention of it in the conveyances of Arnold's Close, if in existence in 1606-1621, it must have been on the Whitley side of the stream and perhaps near the mouth of the burn.

Following upon Robert, there is a whole succession of Doves at Tynemouth and Whitley. One of the most notable of these was Christopher Dove, whose will is dated 8th April, 1589, and who was buried at St. Oswin's Church, Tynemouth. This Christopher had a nephew, Robert of Whitley (will dated 1619), who was the father (according to Mr. Maberley Phillips) of Thomas Dove, who purchased Arnold's Close of the Wranghams in 1621. From this time forth there was a complete succession of males for four generations, who were owners of the freehold

of Arnold's Close together with considerable copyhold property at Whitley for over a century—say from 1621 to about 1730. In order to distinguish them from numerous sections of the same family, who at various times held property in the district, I propose to designate these four successive owners of Cullercoats as Thomas Dove I., John Dove I., Thomas Dove II., and John Dove II. This arrangement will form a convenient chronological basis for the events to be recorded, though owing to some imperfections in the record there may be a certain amount of overlap in the four divisions of the succeeding narrative.

Thomas Dove I.

This was the first member of the Dove family who is associated with Arnold's Close and the future village of Cullercoats. So far as I know, the date of his birth is unknown, but, according to Mr. Maberly Phillips, he was named in the father's will of 1619, and left joint executor with his mother. As the purchase of Arnold's Close would take place after he came of age, we may presume that he was born about the end of the sixteenth century. Supposing him to have been born in 1596, he would be 25 years of age at the date of the purchase, and 70 years of age at the date of his death in 1666. It is presumed that he was a man of some substance when he bought Arnold's Close of the Wranghams in 1621 for £40. In that deed he is described as "of Whitley, yeoman." It is significant that there is no mention of "Cullercoats" or anything approaching that name in the transfer, but the boundary on the south corresponds on the whole with the boundary described in the deed of 1618, already quoted (p. 8), and runs as follows:—"Bounderinge the Lord's Merse on the weste and uppon a beck or riever called Marden on the north and the sea banke towards the easte and uppon a gutter or running sworle towards the south easte which

said south easte pte of the said close was late the inheritance of Michael Welden of Welden Esquire and is now in the tenure and occupation of the said Thomas Wrangham."

We have seen that Thomas Dove I., yeoman, of Whitley, had become the owner of Arnold's Close, but there is no documentary evidence as to any transactions in connection with this property between 1621 and 1644, which latter is also the date of the battle of Marston Moor. On the whole, the Northumbrians of those days were Royalists, and the astounding bravery of Newcastle's "Whitecoats" in that action might easily have produced a different result had the King's army possessed a general of even ordinary competence. I mention this, because there is every reason to suppose that Thomas Dove I. was a Churchman, and most probably a Royalist, since he was one of the Tynemouth Four-and-Twenty in 1645, when matters were becoming critical.

From the deed of 4th May, 1644,* it would appear that certain houses belonging to Thomas Dove I. had been erected in what was probably the north-east corner of Arnold's Close, and now the owner grants a further piece of ground to one Richard Simpson, a miller, on a ninety-nine years' lease, thus commencing a practice of alienation which was followed on a more considerable scale by his successors. It was out of these concessions that the town or village of Old Cullercoats was evolved. Still there is no mention even in this deed, so far as quoted by Mr. Tomlinson, of any such place as Cullercoats,† and the grant to Simpson was made out of "part of the freehold called Arnold's Close, belonging to Thomas Dove." It should be noted also that liberty was granted to Richard Simpson to "fish with one boat to be builded repaired and managed" at the equal charge of Thomas Dove and himself. From the above we gather that Arnold's Close was regarded as the freehold of

* Not in my possession. † See footnote, p. 25.

Thomas Dove, and that he also possessed certain manorial rights in connection with this freehold, as evinced by his granting liberty to fish.

The years which succeeded 1644 were amongst the most eventful in English history; and the ten years from 1650 to 1660 were approximately coincident with the rule of the Great Protector. There is very little evidence to show us what Thomas Dove I. was doing in those days, and whether or no he accommodated himself to the new order of things. This much we do know, that George Fox, "the great founder of the Society of Friends,"* paid his first visit to Newcastle in 1653, and that on the whole the policy of Cromwell was tolerant if not favourable towards the new sect.

The followers of George Fox seem to have been pretty numerous and influential both on the Tyne and the Tees, and there can be no doubt that during the Protectorate many adherents were gained amongst the middle classes in such places as Whitley and Cullercoats. The numerous family bearing the name of Dove contributed several staunch adherents to the Society of Friends, but it is still doubtful whether Thomas Dove I. can be reckoned in that number.

It seems pretty certain that about 1661, a small piece of ground in Arnold's Close was enclosed by a member of the family of Dove for purposes of burial independent of the Church (a Quaker burial ground). Was this done by Thomas Dove I., or by his eldest son, John Dove I.? My late father and Mr. Tomlinson were of opinion that it was Thomas Dove† who did this, whilst on the other hand, Mr. Craster and Mr. Maberly Phillips favour the view that it was John Dove who set aside

* Maberly Phillips, *Arch. Ael.*, 2nd series, vol. xvi., p. 275.

† As it appears that Thomas Dove of Whitley was buried on December 10th, 1650 (see Tynemouth register), Mr. Tomlinson is now of opinion that the burial ground must have been enclosed by John Dove.—J.J.L.

the ground for enclosure. Something may depend upon the date of the death of Thomas Dove I.* According to Mr. Maberly Phillips, it was in 1666 that the will of Thomas Dove of Whitley was committed to Richard Otway and Margaret Dove, widow (buried in 1675 " in St. Oswin's, Tinmouth "). Hence, if Thomas Dove I. lived to the year 1666, he must have been the owner of Arnold's Close at the time when the burial ground was given, namely, in 1661.* Therefore, unless he had previously made over the Close to his son, he must have been at least a consenting party to the transaction, though it does not appear that the piece of ground was ever specially conveyed to trustees as being set apart for purposes of interment. Whether the bit of land was given by Thomas Dove or his son,* there can be very little doubt that the latter was an active member of the Society of Friends, and it was through his instrumentality that the gift was made. On the 20th November, 1661, Johanna, daughter of George Linton of North Shields, was the first person buried at "Cole coates." Three years later another burial is recorded at " Culvercoats."

John Dove I.

is said to have been born in 1620, *i.e.*, just one year before his father purchased Arnold's Close. Died 20 January, 1679, aged 59. There is no particular mention of him previous to 1661, when he distinguished himself as a champion of the Society of Friends, by getting locked up in Tynemouth Castle. The Doves, either father or son, or both of them,* gave the burial ground in the same year. John Dove I. was just about 40 years of age on the accession of Charles II., and we may feel sure that the events of the previous twenty years were not without their influence on his thoughts and character. It is evident that the teachings of George Fox had made a considerable impression

* See footnote on previous page.

upon him, as well as on many of his relatives and neighbours. He appears to have been the first declared Nonconformist of the family in a district where they were by no means scarce.

Beyond the fact that he was an Independent stalwart, associated with the Hudsons and other families of a similar way of thinking in the neighbourhood, there is not much to chronicle in the life of John Dove I.* His first wife's name was Mary , who died on the 20th December, 1672, and was buried at Cullercoats. There is a curious story told by Maberly Phillips, that in 1675 John Dove's children appear to have caused some anxiety to the members of the Society of Friends, as at the monthly meeting held "8 day 9 month," several Friends were desired to speak with him touching his children, and give an account thereof at the next monthly meeting. His second wife was Hannah Lascelles,† but he did not live very long after this second marriage, since only seven years elapsed between the death of his first wife and his own death at the early age of 59.

It is evident, however, that the last few years of the life of John Dove I. were marked by considerable activity in business, more especially in connection with coal-mining, both at Whitley, where he resided after leaving Monkseaton in 1663, and also at Cullercoats. Ten years after leaving Monkseaton, namely, in 1673, he leased the collieries at Whitley for twenty-one years from the Earl of Essex and William Pierpoint, and these collieries appear to have become so important that in July, 1677, the owner, Lady Elizabeth Percy, addressed a petition to the Lord Treasurer that she might avail herself of a "place on her own estate called Caller Coates" for the purpose of exporting

* In 1663 the rental of Whitley was returned at £100 per annum, of which sum John Dove I. is credited with £30. A schedule of his possessions is given on p. 39 of Mr. Tomlinson's book.

† The Earls of Harewood are descended from this lady's father.

coal, etc. At this time it would seem that John Carr of Newcastle, John Rogers of Denton and Henry Hudson* of Newbiggin were associated with John Dove I. in the Whitley collieries. It was a trifle inaccurate on the part of the heiress of the Northumberlands to describe "Caller Coates" as a place on her own estate. However, she was quite right in joining the lessees in the erection of a pier in the harbour, which pier is said to have occupied five years in construction, and to have cost a little over £3,000.

The formation of this pier may be said to mark a new phase in the history of Arnold's Close, and of the growing village which was henceforth to be known by the various names which finally settled down into *Cullercoats*. On the whole, it seems probable that some such name as "Culvercoates" was applied to the bay, and probably to the rocks on the south side of the bay. When the village on the seaward side of Arnold's Close gradually arose, owing to concessions on the part of the Doves, it seems to have been known by a name, of which we have notice in Delavale's deed of 1606, under the guise of "Couller Comers." This word may have been a corruption of some previous name applicable to the bay and part of the district, but certainly not to any village at that time.

In a deed dated 2nd June, 1677, Robert Dove is described as of "Colvercoats," and it is clear that by that time several houses had sprung up. So far as I know, this is the first mention of Cullercoats as a collection of houses which could be regarded as a village.†

Henceforth it was to become a place of importance, possessed of a pier and a railway, as is testified by the deed of

* This Henry Hudson was an ex-Cromwellian soldier who appeared upon the scene shortly after the disbanding of the army on the accession of Charles II. He, like John Dove I., was an Independent stalwart, and founded a family in the district, with which the Doves frequently intermarried. *Vide infra.*

† See footnote, p. 25.

30th July, 1677. This was an indenture of lease between John Dove I. of Whitley, gentleman, Thomas Dove, his son and heir apparent, and Ralph Hedworth of Chester Deanery, esquire, of the one part, and John Carr of Newcastle, merchant, of the other part. It will be observed that John Dove I. is here described as a "gentleman," whereas his father was described in previous deeds as a "yeoman." The term was 99 years at an annual rent of £5, and the following is a description of the premises:—

> "All that parcel of ground containing 2 acres be it more or less as the same is now dowled marked and set forth, being part and parcel of Arnold's Close alias Mordant Close, lying and being within the fields territories and precincts of Tinmouth, that is to say six buts or ridges of land at the head of the bank next the Poir or Key there lately erected. And also all that parcel of ground containing 15 yards in breadth as the same is dowled marked and set forth for a waggon-way or waggon-ways through the said close from the upper damm belonging to Tinmouth mill alias Morden Mill to the Poir head and top of the Bank. And also all that parcel of waste ground, below the bank of the said Arnold's Close as the same extendeth from a high-water mark to a low water-mark or so far as the sea doth ebb and flow to the utmost bounds whereupon the said key poir or wharfe is now erected and built together with the *ground and soil whereupon the said Poir, Key or Wharfe is now erected and built.*"

There are certain points of interest which arise from the consideration of the foregoing extract, apart from its value as proof of the growing importance of Cullercoats.

(1) It is evident that the lessors considered themselves to be in full possession of foreshore rights in connection with the portion of land demised by this deed, and that these rights extended to that portion of the foreshore on which the pier was built.

(2) Those enterprizing men,, John Dove I. and his son Thomas, may be credited with having been concerned in the making of one of the earliest waggon-ways constructed in

Northumberland. Mr. Maberly Phillips, quoting from Richardson, says that the earliest record of coals being delivered by waggon was 1671, at Teams staiths, only six years prior to the formation of the waggon-way at Cullercoats. When we bear in mind that in these waggon-ways for coals there lurked the germ of the future railway, we must admit that the Doves were early in the field of commercial and mining enterprise.

(3) The waggon-way—15 yards in breadth—was intended to bring the coals from Whitley colliery to the haven of Cullercoats, where they were shipped. It ran from the Whitley colliery "down by the south side of the Marden burn, past the north wall of the old burial ground, and then at a point now occupied by Albert Place (the north end of Brown's buildings) turned into the present main street of Cullercoats, continuing along the west side of the same until it reached the bank top, where the look-out house now stands. Here the coals could be shot over the bank in spouts to the vessels below."* To anticipate, this waggon-way seems to have been in existence after the destruction of the pier in 1710, for it is mentioned in the will of one Robert Southern (14th January, 1734), when reference is made to tenements *bounded by the street or wagon-way on the east.* A few years ago, when cellars were being excavated for the "Newcastle Arms," the rails and sleepers of the waggon-way were unearthed.

As a further stroke of business, on the 28th October, 1677, John Dove I., in conjunction with his son Thomas and Ralph Hedworth, leased to John Carr for thirty-one years all the lead-ore in Arnold's Close; and on the 12th November, 1677, the two Doves and John Carr leased to Thomas Fearon of South Shields, salt merchant, for ninety-eight years, "all that parcel of ground, containing 14 yards in breadth and 30 yards in length,

* Maberly Phillips, *op. et vol. cit.*, p. 284. See appendix, p. 114.

lyeing and being in part of Arnold's Close extending from the rock where the Gutter runs down under the Banke, as the same is now marked dowled and sett forth, nigh unto the Key, Peare, or wharfe lately erected and built at Callercoats for the building and erecting of two salt-panns thereupon, etc." Fearon was further empowered to erect, above the Hill or Banke, Garner's and Salter's houses and he enjoyed other privileges all for the yearly payment of twelve pence. In return for this he covenanted to take such coal as he required for the saltpans from "John Carr and John Dove's Collyery and Cole-mines now wrought nigh Whitley."

Judging from the description of the position of these saltpans, it seems probable that they were at the southern extremity of the Dove's estate, and certainly not far from the spot where the bath-house was subsequently erected.

Everything in connection with the Dove's estate, both at Whitley and Cullercoats, seemed to be in a prosperous condition, and ripe for further developments, when John Dove I. was cut off on the 20th January, 1679, at the early age of 59, apparently not many years after his second marriage. That he was a conscientious and perhaps somewhat ardent member of the Society of Friends there can be very little doubt. It is significant that his father (Thomas Dove I.) was not buried in the private ground at Cullercoats—an argument in favour of the view that John Dove I.* was the prime mover in setting apart the small area subsequently known as the Quakers' Burial Ground. If this step was taken in 1661, as is generally believed, it seems to have been an act of defiance for his short imprisonment in Tynemouth Castle. He himself was buried there. His first wife, Mary, was also buried at Cullercoats, in December, 1672, and his second wife (subsequently Mrs. Selby) on the 14th November, 1684.

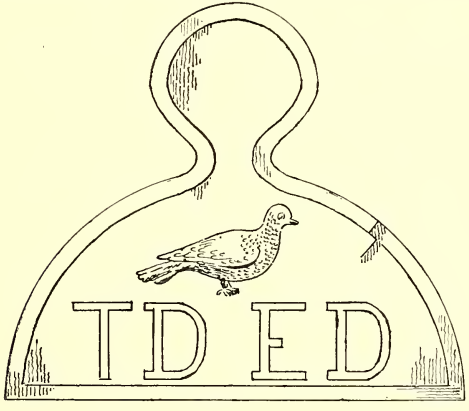
* See footnote on p. 13.

Thomas Dove II.

There does not appear to be any precise information as to the date of his birth. Presuming that he was born in 1645 or thereabouts (his father was then 25 years old), he would be 34 years of age at the time that he succeeded to the property in 1679. He held it 25 years, and must have been about 59 years old at the time of his decease. Although this calculation is based on imperfect data as to the exact period when he was born, it seems almost certain that Thomas Dove II. did not attain the age of 60. It should be noted that much of the Whitley property went to his half-sister, Sarah, for many years a minor. However, on October 14th, 1675, there had been a surrender by John Dove of Whitley, gentleman, of his customary lands, namely, two closes called the Northfield and Letch the Side, another called Mardon Close, and a part of his house in Whitley, at the view of frankpledge and court baron of the Lady Elizabeth Percy, held at Preston for the manor of Tynemouth, to the use of his son, Thomas Dove, who at this court was admitted on payment of £4 fine to the lord. In this way a portion of the hereditary property of the Doves in Whitley was preserved to the main line of the family, and ultimately, through Eleanor Dove, came into the possession of the Hudlestons. The major portion of their Whitley property went to other members of the Dove family.

It is possible that this circumstance weighed with Thomas Dove II. in selecting a site for a mansion in that part of Arnold's Close, which was now assuming the name of Cullercoats, still variously spelt in the deeds. The date on a wooden lintel on the north side of the house was 1682, which may be regarded as fixing the period when the house was finished. The initials of Thomas Dove and of Elizabeth Dove, his wife, together with the figure of a dove, are carved on a finial surmounting the east

gable.* Here Thomas Dove continued to reside; it was to this house that he in all probability conducted his wife; here his children were born; and here he died whilst most of them were yet minors. No other member of the family is so thoroughly associated with Cullercoats as Thomas Dove II., and it was in his day that the place may be said to have reached the height of its prosperity, more especially as a port of exportation.



Apex Stone, "Sparrow Hall."

He married Elizabeth, daughter of Richard Shipton of Lyth, in Yorkshire, and the date of the marriage may have been between the 15th December, 1681, and the 5th January, 1682. On the first of these dates there was executed a lease by Thomas Dove "of Whitley," gentleman, to Jane Lorrance of Coller-

* The perverted vision of a subsequent generation converted this bird into a sparrow and thus the house has acquired the name of "Sparrow Hall," which it still bears.

coates, widow, of " a house that borders on the west end of George Harris's house," for a term of fifty years for 10s. annual rent. Witnesses: William Dove, Robert Dove.

There are two things to be noted here: (1) that this lease is granted by Thomas Dove only, (2) that, judging from the names of the witnesses, there were plenty of Doves in the neighbourhood besides those of the main line. In fact they were so numerous as almost to constitute a clan.

On the 26th July, 1682, there was granted unanimously a lease by Thomas Dove " of Whitley," gentleman, and *Elizabeth, his wife*, to William Rogers of North Shields, and Elizabeth, his wife, " for the natural affection they have and bear unto Elizabeth, the wife of the said William Rogers (their sister), a certain parcell of ground in Arnold's Close near Culvercoats, near the west end of ye said Thomas Dove his mansion house there newly erected," for the term of ninety-nine years for 12d. yearly at Lammas Day, only if lawfully demanded.

Comparing the lease of 15th December, 1681, with that of 26th July, 1682, we perceive that in the latter case Thomas Dove II. has a partner, and that the two " *unanimously* demise," etc. In future deeds, and they are numerous, for some time to come we shall find Thomas Dove and Elizabeth, his wife, associated as the grantors. This does not seem to have been the case with his father or his grandfather. Why does Elizabeth Dove always join her husband in granting leases, etc.? The only reason that I can assign is that Elizabeth Dove (*née* Shipton) was exercising some right of dower in default of a marriage settlement.

There exists amongst the title deeds in my possession, dated 1686 (month blank), an *unexecuted* deed of marriage settlement between Thomas Dove, of Culvercoats in the parish of Tinemouth, gentleman, and Elizabeth, his wife, of the one part, and Richard

Shipton, of Lyth, county York, Matthew Shipton, of the same, and Ralph Hedworth, of Chester, county Durham, esquire, on the other, assigning, in consideration of £200 to be paid as a marriage portion, that "parcell of ground," etc., "commonly known by the name of Culvercoats, also Arnold's Close, also Mordant Close, or by what other name or names so ever the same be called or known, containing by estimation eighteen acres, and also all and every the houses edified Buildings Saltpanns . . . whatsoever thereupon or upon any part or parcell thereof erected, built or being . . . also with all manner of works, scarres wracke of the sea, Colemines and other mineralls whatsoever, etc., etc." as the jointure of the said Elizabeth, wife of Thomas Dove, and one of the daughters of Richard Shipton.

On the execution of this settlement, dower was to be barred, but, as the deed apparently was never executed, dower was not barred. The recital of this unexecuted deed, though written a few years subsequent to the date of events more immediately under consideration, is interesting as showing the state of affairs in Arnold's Close, now thoroughly identified in its connection with the village of Cullercoats. The extent of the Dove property at Cullercoats is estimated at eighteen acres, which is the first definite account we have of the area of Arnold's Close. Does this include or exclude the two acres already granted for the waggon-way?*

We now come to the consideration of the deed of 5th January, 1682 (the first joint deed of Thomas and Elizabeth Dove). Here Thomas Dove is described as "of Culvercoats of Tinmouth." The grantors demise to Richard Shipton of Lyth, county York, the father of Elizabeth, "all those colemines or seams of coales and other mines and mineralls as well opened or not opened," lying within the bounds of Thomas Dove's free-

* We have already learnt, *ante*, p. 7, that the modern poor-law township is limited to fifteen acres.

hold lands at Culvercoats, known as Arnold's Close, otherwise Marden Close, etc. The premises are described, and include a parcel of ground on the south side of Thomas Dove's mansion-house abutting on the sea-bank, and the rocks from the said bank to low water mark and from the new pier to Marden burn. The term to be for ninety-nine years at an annual rental of £5, together with a certain royalty on the coal won. There is an endorsement on this deed which seems to point to the possibility of the lessee giving up the lease. Both the deed and the endorsement are attested by the following witnesses: Henry Hudson, Willm Dove, Richard Bossman, Georg Harris.

Mr. Maberly Phillips* very naively observes that he cannot obtain any information as to whether this project of coal-getting was ever carried out. He quotes Mr. Hudleston as stating in 1770 that there is "a good band of coal extending through the whole freehold for the working of which the late Mr. Dove entered into partnership, but was prevented from carrying it into execution by his death." This latter statement is very vague, nor do we know exactly who is meant by the "late Mr. Dove," whether it was Thomas Dove or his son, John Dove of Wapping.

A letter from Richard Shipton to Thomas Dove and John Peele, dated 24th January, 1684, *i.e.*, just two years after the granting of the coal lease, may help to throw some light on the matter. It commences as follows:—"Sonn Dove and John Poole, I expect you should joyntly manage all things and you need not doubt of my concurrence wherein you mutually agree, but my desire is that you take Thomas Fearon's advice when you can have it; I think it very convenient to sinke another pit, but leave all to your judgment, who are upon the place and must see better into the reason of things than I can at this distance; you must use what means you can to get to the seam, and if it

* *Op. et vol. cit.*, p. 285.

prove worth our labour then a horse engine can be contracted for." The letter then refers to some business transactions, and the writer complains greatly of the severity of the winter. In a postscript he adds, "Tell both my daughters that I am much displeased at their breach of duty in not writing to me oftener." Addressed "For Thomas Dove at his house in Cullarcoats neer Tynemouth." By post to Newcastle, pd. 2d. to Newcastle.

It would appear from the above that two years after granting the coal lease, "Son Thomas Dove," in conjunction with John Poole, were acting as agents on the spot for the lessee, and beyond this I have no information as to the success or otherwise of the venture. The area is too limited for any great operations, since some portion of the alleged eighteen acres towards the south-west consists of Permian sandstone. There are outcrops of coal seams in the low cliff north of the pier and, it is said, also in the bank of Marden burn, but the number of houses now growing up on the eastern portion of what was once Arnold's Close must have been prejudicial to shallow mining, whilst deep mining would cost money. On the whole, it seems probable that coal mining at Cullercoats was not carried on for any length of time. It was about this period, namely, in 1685,* that "Collar Coates," and "Whitley Pitts," are marked in Colliers' Chart of the Tyne. This is the first time, I believe, that the name Cullercoats appears on any map or plan of the district.

Although some minor transactions are recorded in the deeds, there was nothing of importance done at Cullercoats until, on the 8th and 9th September, 1690, Thomas Dove II. and his wife entered into engagements with John Atkinson, the agent of the lessees of the Whitley collieries, which materially altered the conditions of things at Cullercoats.

* The name "Cullercoats" appears in the Tynemouth register of baptisms as early as 1642, and from that time forward there are constant entries in the register relating to Cullercoats. See also pp. 4 and 16.—J.J.L.

It is not easy to understand the full meaning of the various documents accompanying these transactions. Thomas Dove was to receive £170 and he seems to have conveyed portions of Arnold's Close to Atkinson in trust for fifteen persons—for periods mostly of fifty-one years—the full legal effect is not quite clear. Amongst these conveyances is one to Robert Dove, of ground 45 yards in length and 15 yards in breadth, "adjoining upon the said Robert Dove's garden wall." These are the premises now occupied by Garden House. Mr. Tomlinson says that Robert Dove died in March, 1693, and was buried at Tynemouth.

This was the finishing touch to the making of Old Cullercoats, but the full extent of these transactions with Atkinson could not be appreciated until we read the deed of 23rd October, 1695. This is a lease by Thomas Dove II., for nine years, to John Wright and Andrew Walker, both of Cullercoats, yeomen, of a field of six acres, commonly called Arnold's Close, for the rent of £6 10s. From the fact that the name Elizabeth Dove does not appear it may be conjectured that she had died between 1690 and 1695. The chief point to emphasise is that Arnold's Close, as a field, had shrunk from eighteen acres to six acres, one acre less than its area in the middle of the nineteenth century.

About this period there are indications that Thomas Dove II. was rather in want of money, and that he was in debt, amongst others, to Thomas Airey of North Sheels. This was especially the case in 1698. Again, in 1700, there is a declaration of trust by John Atkinson of Cullercoats, that certain ground in Whitley had been surrendered to his use to secure payment of £100 to Magdalen Harris. On the 25th January, 1699, articles are indicated between Thomas Dove of Cullercoats of one party and certain masons of the other party for permission to quarry in the "Side Close," which is evidently in Whitley. With these

transactions the history of the seventeenth century comes to an end. So far as I can tell at present, there has been no joint signature of Thomas Dove and Elizabeth his wife since the grants made to Atkinson, etc., in 1690.

Mr. Maberly Phillips says that there was a settlement (marriage) in 1691, when possibly the provisions of the unexecuted deed of 1686, already quoted, were carried out, since the conditions appear to be the same. In 1692 (29th October) there is a lease by Thos. Dove of a parcel of ground in Cullercoats, and this is the first transaction known to me in which the name of Elizabeth Dove does not appear; nor does it appear subsequently in deeds. There is an account dated 5th December, 1693, signed John Atkinson, with Mrs. Dove, from the owners, for the "Peire, Waggon-way, panns, pittmens houses and Side Close and the greatt house att Cullercoatts," amounting to £16. 17s. 6d. There are also other items and some deductions, the balance in Mrs. Dove's favour being £22. 15s. 11d.

Does this refer to Elizabeth, wife of Thomas Dove II.? John Atkinson was the agent for the owners of Whitley Colliery. In point of fact the last joint signatures were to Atkinson's deeds. What happened to Elizabeth Dove is not exactly clear. There is no mention of her death, nor is there any *certain* record that she was interred in the Dove's burial-ground, as so many members of the family were.* Also there is no mention made of her in the will of Thomas Dove II.

* In the notice by Maberly Phillips (*op. et vol. cit.*, p. 290), there appears the following entry in the list of burials in the Cullercoats burial-ground:—"1694. 28, 12. Elizabeth D. John Buston of No. Shields, skinner, and Isabel, his wife." It is highly probable that Elizabeth, wife of Thomas Dove II., did die about 1694, and this entry may refer to her.

We observe likewise in Tomlinson's *Historical Notes* (p. 26), amongst the list of headstones removed in 1872 from the Cullercoats burial-ground, the following:—"Ellenor, wife of Thomas Dove, of Cullercoats, March 2nd, 16—." In this case the name "Ellenor" may be a mistake for "Elizabeth."

The last transaction recorded of Thomas Dove II. consists of articles of agreement, 25th March, 1704, between T.D. of Whitley, gentleman, and Andrew Walker and Thomas Fenwick, both of Cullercoats, yeomen, being the lease of Arnold's Close, adjoining the village of Cullercoats, for ten years at a rent of £6. 10s. This is the same rent as was reserved in the lease granted nine years previously, one of the tenants being the same. It may be noted that Thos. Dove is described as of Whitley; also Arnold's Close is described as adjoining the village of Cullercoats, which by this time was nearly coincident with the area of Old Cullercoats of the present day.

The will of Thomas Dove II. is dated 15th April, 1704 (probate dated 17th October, 1704). Since he was a well known member of the Society of Friends, the opening clause of this will is not without interest. "In the name of God, amen. I, Thomas Dove of Whitley, gent., being under weakness of body, but in sound and disposing memory, praise be given to God for the same, do make this my last will and testament in manner and form following, that is to say, first and principally I resign my Soul into the hands of Almighty God my Creator, assuredly hoping through the merits of my blessed Saviour to obtain remission of all my sins; and my body I commit to the earth from whence it was taken* to be decently buried by the direction of my executor hereinafter mentioned and for my worldly goods and estate the Lord hath sent me I dispose of as follows."

He leaves his son John Dove all his freehold estate of land and houses situate at Cullercoats called Arnold's Close (this of course in the wider acceptation of the term); to his daughters Hannah Dove and Ellener Dove £100 each; to his sister Elizabeth Rogers, £5; and as regards the £100 due to Magdalen

* "Then shall the dust return to the earth as it was, and the Spirit shall return to God who gave it," Eccles. xii., 7.

Harris, he directs that the same be raised out of the two-thirds of his copyhold estate at Whitley already pledged to John Atkinson, for this purpose, any surplus or remainder to be made over to his son. Henry Hudson, the second son of the ex-Cromwellian who married Sarah Dove, daughter of John Dove I. by Hannah Lascelles, is appointed sole executor.

It is evident that Thomas Dove II. died shortly after making this will; and, if John Dove his son was born on the 9th April, 1684, he would not be of age until 1705. All Thomas Dove's children appear to have been under age at the time of his decease. It should be noted that in the will, just as in the more recent deeds, he is described as of Whitley, and therefore it is conjectured that he had ceased to reside at Cullercoats for some years. Certainly there are several points in the later history of Thomas Dove II. which seem to require explanation. By all accounts he continued steadfast in his connection with the Society of Friends. He was buried in the Cullercoats burying ground, and when the removal took place in 1872, a much defaced stone, now at Preston, is thought to have marked his resting-place.*

John Dove II.

apparently came of age in April, 1705, when he found himself in possession of his father's interests in Cullercoats, such as they were, and of some fragments of the Whitley property, not altogether a very lucrative inheritance. Thus it came to pass that about the year 1706 he sold his mansion to Zephaniah Haddock, cordwainer of North Shields, who had married Eleanor, daughter of William Dove of Whitley.

* There is considerable variation in the lists of those interred in the Friends' burial-ground; but Mr. Maberly Phillips, in his pedigree, distinctly states that Thomas Dove II. was buried there. Many other members of the Dove family were also buried there, and the list includes such well-known names as Haddock, Atkinson, Fearon, etc. The last regular interment is stated to have been that of Zephaniah Haddock of Cullercoats, in 1739.

This period represents the top of the tide for Cullercoats, and some idea of the value of property in the hands of certain persons may be obtained from a reference to a marriage settlement by Thomas Fearon, dated 23rd November, 1706. This man had inherited from his father the benefits of a lease, already quoted,* as having been granted *circa* 1677 by John Dove I., Thomas Dove II., and John Carr for the purpose of erecting saltpans on a site almost coinciding with the present Dove Memorial Building. Now, Thomas Fearon contemplated marrying Barbara, daughter of William Dove of Whitley; and he, for the jointure of his intended wife and the raising of £100 for any daughter to be born of her and for the better provision of his children by a former marriage, sets over to trustees half of the parcel of ground originally leased, containing the south saltpan, and half of the salter's houses, etc., for the purposes above specified. Thus it would appear that a "Boilery of salt" was not a bad thing to have in those days. This Thomas Fearon appears to have died on the 3rd April, 1717, and was interred in the Dove burial-ground.

There is no need to anticipate history too literally, but it may be gathered from several authors, and more especially from Mr. Tomlinson, that the prosperity of Cullercoats was destined to wane very materially before the eighteenth century was many years old. The injury to the pier in 1710 must have been prejudicial to the export trade; yet salt boiling flourished, and Mr. Tomlinson says that from a deed, dated 14th June, 1710, we learn that Arnold's Close was in the possession of Andrew Walker and Thomas Fenwick, "and seven saltpans are said to be then erected on a part of the Close."† Thomas Dove II. scarcely contemplated this when he leased this now limited

* P. 18, *supra*.

† *Historical Notes on Cullercoats, etc.*, p. 13.

field to these two tenants just before he died.* It may be further noted that the removal of the last saltpans to Blyth, about 1727, marked the further decay of Cullercoats as a harbour for exports.

Whatever may have prompted his action, it was not long before John Dove II. sought a more extended sphere for his energies than was presented by his native Cullercoats. It may be that his instinct told him that there was no chance of establishing a port of any consequence in such close proximity to the mouth of the Tyne. Undoubtedly he wished to increase his income, which must have been far less than that of his grandfather. Doubtless he had good reasons for leaving his native county, and it would be interesting to know when he went, how he travelled, and who were the friends who assisted the young man in his bold venture.

Since he settled in that part of London known as Wapping, it is not improbable that he journeyed by sea in some vessel connected with the coal trade. All, however, is conjecture, nor is the precise year in which he left Cullercoats known. With the exception of certain surrenders of property at Whitley, where he is styled "of Wapping, grocer," there are only two deeds amongst the family papers which refer especially to John Dove II. These are the deeds connected with his marriage settlement and dated 14th June, 1710.

The first of these is an indenture tripartite between John Cay of South Shields, Wm. Atkinson of Monkseaton, and John Hall of Whitley of the first part, John Dove of Wapping, grocer, of the second part, and Mary Hudson of the third part. John Dove surrenders two full third parts of his copyhold at Whitley in trust to the three above named for himself for life and after his death for Mary Hudson, and after her death for their issue in tail male, and for lack of such to the daughters and their heirs.

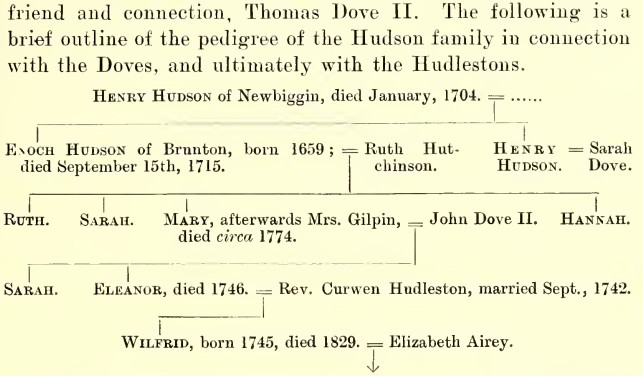
* *Vide supra*, p. 28.

Contemporaneously with the above there is a quinquepartite indenture relating to John Dove's property at Cullercoats, but before quoting this document, it is only right that we should interest ourselves in his intended bride, Mary Hudson, who will figure in the future history of the Doves, not only as Mrs. John Dove, but also as Mrs. Richard Gilpin.

It has been mentioned that inter-marriage between the families of Dove and Hudson had occurred previously, they being allied by community of interests and religious convictions, and also as representing to a certain extent the well-to-do *bourgeoisie* of this corner of Northumberland. The Haddocks were another family of this class, and it was to Zephaniah Haddock that John Dove II. sold his father's great house in Cullercoats, subsequently known as Sparrow Hall, *circa* 1706. This Zephaniah Haddock himself had married Eleanor, daughter of William Dove, yeoman of Whitley, and, as before stated, he was the last person who was interred in the Dove burial-ground at Cullercoats in 1739.

We must now glance at the history of the Hudson family. It has been stated previously that the founder of this family was the ex-Cromwellian soldier Henry Hudson, one of the heroes of the battle of Dunbar, who appeared on the scene towards the end of the Protectorate, and took up his quarters at Newbiggin. He was instrumental in developing collieries and also other mines, and was especially interested in the one at Whitley, and thus became connected with the pier at Cullercoats. Mr. Tomlinson says of him that his family occupied a leading position in Whitley for 100 years, that he was a sturdy north-country Puritan and had a capacity for acquiring wealth. About 1684 there was a persecution of Nonconformists in the north, when Henry Hudson with some others, who lived at a distance from towns, were able to give hospitable entertainment to many

fugitives. So far, I have not ascertained whom he married, but he died in January, 1704, a few months before the death of his friend and connection, Thomas Dove II. The following is a brief outline of the pedigree of the Hudson family in connection with the Doves, and ultimately with the Hudlestons.



It will be perceived from the above that the Rev. Wilfrid Hudleston of Whitehaven and of Handsworth, near Sheffield, was the great-great-grandson both of Thomas Dove I. and of Henry Hudson I. The present Mr. Hudleston of Cullercoats is the great-grandson of the Rev. Wilfrid Hudleston aforesaid.*

* Whilst on the subject of pedigrees, we may take note of another interesting fact with regard to the descendants of the principal line of the Dove family, which is pointed out by Mr. Maberly Phillips (*Arch. Ael.*, xix., to face p. 125). It will be remembered that Thomas Dove I. had three sons, namely, John Dove I., whose history we have already studied; Robert, formerly of "Tinemouth," but who afterwards erected a house at Cullercoats; and William, who was born in 1629 and died in 1714, aged 85 years. This man was a thorough-going member of the Society of Friends and was buried in due time at Cullercoats. His elder brother, John Dove I., in his will, dated 1678, names the five children of his brother William. One of these, named Eleanor, married Zephaniah Haddock, who bought the "great house" at Cullercoats in 1706. The Haddock family was very numerous, but all the males seemed to have died without issue. Barbara Haddock married John Simpson and Patience Haddock married John Heddon. Their present day descendants, namely, Richard Simpson and Elizabeth Taylor, were joint owners and occupiers of "Sparrow Hall," when Mr. Maberly Phillips wrote in 1896. Thus the descendants of the Doves, both in the main line and in the branches, are all through females and their surname itself appears to be well-nigh lost in the district.

After the above digression it is now time to consider John Dove II. and his marriage settlement. This is also dated 14th June, 1710, and the previous tripartite indenture relating to the Whitley property is quoted. By this indenture quinquepartite John Dove, in consideration of £700 received from Enoch Hudson, as the marriage portion of Mary Hudson, his intended wife, settles Arnold's Close at Cullercoats and property at Whitley on the said Mary Hudson; Enoch Hudson and Henry Hudson to be the trustees, John Dove to enjoy the rents and profits during his lifetime without impeachment of waste. Should Mary Hudson survive him the property after her death is to pass to the sons in tail male and for lack of male issue to the daughters of John Dove and Mary Hudson and the heirs of their bodies as tenants in common and not as joint tenants. There are two features of this deed which have a special interest, (1) the description of the Cullercoats property at the time of settlement, and (2) the words of the entail:—

(1) "All that close called Arnold's Close at Cullercoats, now in the possession of Andrew Walker and Thomas Fenwick, and all that ground whereupon seven saltpans are now erected, being heretofore part of Arnold's Close. And all that parcel of ground containing two acres, that is to say, six butts or ridges of land at the head of the banks next the pier; and also all that parcel of ground containing 15 yards in breadth, as the same is set forth for a waggonway, in through and along the said close from the upper damm belonging to Tinmouth mill to the pier-head and top of the bank. And also all that parcel of waste grounds below the bank of Arnold's Close as the same extendeth from high water mark to low water mark as far as the sea doth ebb and flow into the utmost bounds whereupon the said key or wharfe at Cullercoats is now erected and built together with the ground and soil whereupon the said key, pier or wharfe is now

erected and built. And all other the charter or ffreehold lands, messuages, tenements, etc., whatsoever belonging to him the said John Dove in the parish of Tinmouth."

We may note that John Dove claims the soil on which the pier is built, though not the pier itself. The settlement of all his property in Tinmouth parish was complete, and, as we shall see subsequently, his widow was not slow to avail herself of these privileges.

(2) The trustees are to stand seized " for the use and behoof of the first son of the body of the said John Dove or the body of the said Mary his intended wife lawfully to be begotten, and the heirs male of the body of such first son lawfully to be begotten, and for default of such issue to the use and behoof of the second son, etc., etc., and in default of such issue to the use, etc., etc., of the third, ffourth, ffifth, sixth, seventh, eighth, ninth, tenth and all and every son and sons of the bodies, etc., severally successively and respectively one after another (charged and chargeable as aforesaid) as they each and every of them shall be in seniority of age and priority of birth." Through the irony of fate John Dove II. had no sons, and such daughters as he might have were to inherit as tenants in common, which proved ultimately to be the case. Another point we note is that the law of primogeniture was by no means rejected by members of the Society of Friends.

It is satisfactory to observe that John Dove II., though no longer a resident in his native county, was content to seek his wife amongst his friends and kinsfolk in Northumberland. Yet the fact of his residing elsewhere seems to a great extent to have severed his personal ties with Cullercoats. Hence there are no deeds of any importance after 1710 which throw any light upon his dealings with the Northumberland property. Little is known of his career in London, and if it were not for two

letters written in 1718, which are preserved in the family archives, we should have no evidence whatever in his case. The first of these letters runs as follows:—

"To Mr. John Dove,

"att the hermitage stairs

"in Wapping, London.

"St. Petersburgh, the 1st August, 1718.

"Sir,

"Have not wrot you since the 20th June last, not having anything material to advise you off as to the arrival of the shipps your Brother acquainted you thereoff, which prevented my writing to you myself, being in a hurry of buissness for this being a new port there is not yet a regular method taken for making dispatch in unloading and loading our shipps, and our customehouse is also irregular, which prolongs time and gives us more trouble than there wou'd be occasion for, but as next year the new Colledges being to sett by a special order of his majesty, by which we are of opinion all matters will be accomodated, and everything relating to buissness will be much easier. I have not yet had time to compare all the goods to see if they agree with the Invoyce, but find no account from you of the clocks and watches, which makes me att a loss what price to demand for them, but however I shall get the most I can for them, as to the quallity I shall refer you to my next when I shall write you att large and give you a full account of the needful but must hint you in the meantime that the profitt of said Cargoe will be pleasing to us which I find from what I have already sold, but an account of the sales of everything that may be sold, shall be sent you in due time. I have dependence that you'l have done your utmost in compleating my orders concerning the sending of a galley hither, and find the project was well founded, for hemp on 'Narves Bruck' here is sold now att Rp. nine roubles 'off birquett' which we count extraordinary cheap and must undoubtedly give a sattisfactory account, a prodigious quantity of said commodity will remain here the whole year, as well as other goods, for we have not so many shipps as we expected, so that the Russes comes to us capp in hand, in fine if you have mannage that affair as I directed you we shall reap the benefit, for I am sensible without something extra happens we must get considerable by it (verte).

"I must consign you a considerable quantity of hemp a parcel off flax and linnen and soe wou'd have you prepare place for housing it, if please God, it arrives safe, and it is very requisite you immediately take up your freedome in the Russia company, for you will pay three or four times the vallue that it will cost you provided you doe not by the goods that you'l

receive this year by an extra duty that you'l be obliged to pay on them and as you may doe it for five guineas and save abundance of trouble it would be worth your while. Your brother Grainge has all his chartered loading except tenn tunn and will be wholly loaded by the latter end of next week, he'll make good stowage, goods being very good, and doubt not but he'll approve of the voyage. I wou'd wish I had wrot you to have let the shipp intirely for me for I cannot procure soe much tunnage as I want. I have not further to add at present, but remain with much esteem,

"Sir,

"Your assur'd freind and humble servt,

"WM. STIRLING.

"N.B.—Your brother gives his service to you."

In the following letter, dated St. Petersburg, 5th September, 1718, and enclosing a copy of a letter written on the 15th of the month, Mr. William Stirling again enters into the subject of imports and exports in connection with the Russian trade and continues to give his correspondent in Wapping the benefit of his advice and also the results of his (John Dove's) consignments. Mr. Stirling sends details as to exchange in Russian money and the sale of goods from England. As regards the latter he observes that sugars remain on his hands, the loaves being so very large that none of the shopkeepers care to buy them. "I find," he continues, "the powder sugar is not very current, the figgs and currants were very good. I sold them at two roubles the pood, the reasons at 180 copacks the pood. . . . The sugar candy comes too dear as also the almonds. The usquebah is but very indifferent for which reason I am afraid it will lye on my hands. The long Ells (?) was too good for this market, so that was glad to sell them for a small or very little proffit. The callimancoes were for the most part extra good, I have sold them all at tenn and eleven roubles the round. The screwtores (? escritoires) desks and glasses will give a considerable advantage, but will take some time to dispose of them. The canes are all sold at fifteen roubles the dozen mohair three-twist at two

roubles the pound . . . . handkerchiefs three-fourths yet remains. The hardwares are almost all sold and will render good proffitt, you shall have an account of sales monthly." The writer expresses his intention of drawing a bill at two months on his correspondent for 2,300 roubles, and his surprise at not having heard from him since the 16th July. In a postscript he concludes that the fleet must have passed Reval, "so that there is no fear but they will get home in time."

In this letter there is a note signed J. D. (John Dove), apparently signifying that the bill was accepted to be paid at (illegible). There is the date of 17th October, 1718, and "due X6: 10:1718." The first I presume is the date of acceptance, the latter the date of payment. Certainly John Dove did not write a very legible hand. Both letters are also docketted by him.

It will be gathered from a perusal of the foregoing that John Dove II. of Wapping was something more than "a grocer." We may fairly believe that he might be regarded as a Baltic merchant as well as active in retail trade he had on the banks of the Thames. For this reason it is greatly to be regretted that the leading incidents of his career subsequent to his marriage are for the most part unknown. In Mr. Stirling's two letters we obtain an interesting though momentary peep into the early stages of an important and profitable trade, which was destined to expand immensely in later times. These same two letters, preserved by accident, as it were, also enable us to catch a glimpse of John Dove, though only by reflex light, and thus to make a guess at a life which was destined to an early close. The date of his death is unknown and can only be a matter of inference, as the family papers are very defective for several decades about this period.

Indeed, we must go outside the family papers for information on this point. The first clear intimation I have at present

ELEANOR DOVE.

that John Dove II. was dead is to be found in extracts from the will of Robert Southern, January 14th, 1734/5,* where the following passage occurs:—"All that my messuage and dwelling houses or tenements scituate in Culercoats aforesaid and now in my own possession and adjoining to a parcell of ground *belonging to Mrs. Gilpin on the west* and on the street or waggon-way on the east." Mrs. Gilpin was no other than Mrs. John Dove (*née* Hudson), who was now profiting by the settlement of 1710. There can be no doubt then that John Dove II. had died previous to 1734, since his widow had already married again. We have seen from his signature that he was alive on the 17th October, 1718. Hence the limit lies between the years 1718 and 1734, a period of 16 years, which is certainly wide enough. We obtain some inkling of the probable date from a letter by Andrew Hudleston, of Hutton John, to the Duke of Northumberland in 1770, where the writer refers to the death of John Dove "forty years ago, when leaving only two daughters of tender years." The "forty years" to which Mr. Hudleston refers may have been a somewhat loose expression, but interpreted strictly it would mean that John Dove II. died in the year 1730, or probably a year or so before that date. There is no intimation that he made a will. He left two daughters, Sarah the elder, and Eleanor the younger. It is the story of the latter, in conjunction with that of her mother (Mrs. Gilpin), that we must now proceed to consider.

Eleanor Dove and her Mother.

It is almost certain that both Eleanor Dove and her elder sister were born in Wapping, probably at the Hermitage Stairs. Authentic records are wanting, but there is a tradition in our

* Maberly Phillips, *op. cit.*, p. 284.

family, oft told to me by my Grannie, who was herself a granddaughter of Eleanor Dove, that Eleanor when a child was stolen from her parents in London by a gang of professional mendicants. These wretches were in the habit of appropriating pretty children for the purpose of putting out their eyes and then carrying them about in order to excite compassion. The story goes that the child was rescued just as her captors were on the point of applying hot coppers to her eyes for the purpose of destroying the sight. Grannie also went on to say that poor little Eleanor's eyes were of singular beauty, so much so as to give rise to the following couplet:—

> No power on Earth or Heaven above
> Can match the eyes of Nellie Dove.

Unfortunately we are left without a clue as to the real history of John Dove's widow and two girls. Truly it is a far cry from Wapping to Carlisle, but the next thing we know for certain is that the widow had become Mrs. Richard Gilpin, of Scaleby Castle in Cumberland, and this previous to the year 1734. We may take it for granted that Mrs. Gilpin and her daughters resided at Scaleby Castle and that the girls found in Richard Gilpin a kindly stepfather, who afforded them a home to make up for the one they had lost in London.

We may believe that Eleanor Dove was from 25 to 27 years of age in the year 1742, and we find the following extract from the Scaleby register:—"1742, August 2. The Revd. Mr. Currant (Curwen) Hudleston and Mrs. Elliner Dove married."

There may be some mistake in the precise date of the above, since the marriage settlement is dated 4th August. This is an indenture quadripartite between Edmund Gibson, of Workington, gentleman (1), Curwen Hudleston, of Whitehaven, clerk (2), Eleanor Dove, of Scaleby, Cumberland, spinster (3), and Richard

Gilpin, of Scaleby, esquire, and Andrew Hudleston, of Hutton John, Cumberland, esquire (4), being the settlement of Curwen Hudleston on his intended marriage with Eleanor Dove, namely, £500, paid by Curwen Hudleston, is secured on a messuage, etc., at Monkfoss, in the parish of Whitbeck, for payment of £20 yearly to C. H. and E. D. for their lives and the life of the survivor and of the principal sum in trust for the child or children of Curwen and Eleanor, etc., etc. Witnesses: William Hicks and John Barnard Gilpin. The signatures of the five contracting parties are distinct and well preserved, and the deed is in excellent condition.

Curwen Hudleston was baptized on the 19th January, 1708, in St. Nicholas' Church, Whitehaven, being the second son of Wilfrid Hudleston by Joyce (Curwen) his wife, who were married a few years previously in the same church. This Wilfrid Hudleston was the then laird of Hutton John, near Penrith, and the representative of that branch of the main stock (Millom) who married into the family of Hutton in the early part of the reign of Elizabeth.

Wilfrid Hudleston died in 1729, having previously made his will, wherein he bequeaths to his dear wife the best bed and all things thereto belonging, four chairs and the best looking-glass, "to have and to hold during her natural life." . . . He gives to his son Curwen Hudleston one guinea out of personal estate, to be paid to him by his executor at the end of twelve months after his decease in full of his child's portion. (!) He makes his eldest son Andrew his residuary legatee and sole executor.

The subject of our notice, Curwen Hudleston, would be just of age at the time of his father's death and it is presumed that he went into Holy Orders not long after. How he lived before obtaining a stipend is not clear, for the parental guinea would not go very far. Ultimately he became the incumbent of St.

Nicholas' Church, Whitehaven, and rector of Clifton in Westmorland. Moreover, in 1736, he married the only daughter of Ralph Cooke of Camerton.* The following entry in the register of St. Nicholas' Church relates to this lady:—"1738, Dec. 7. Elizabeth, wife of the Revd. Mr. Curwen Hudleston, minister of this Chapel, was buried." Thus he was a widower at the end of two years, left with two daughters, one of whom, Joyce, ultimately married Lieut. William Shammon, R.N. Such was the history of Curwen previous to his espousing a second wife in 1742.

It may seem a matter of surprise that a girl born in Wapping, of parents who presumably still retained their connection with the Society of Friends, should ultimately marry a Cumberland parson, belonging to an old county family. Certainly Mrs. Gilpin was a wonderful woman, and if we only knew the circumstances leading to her acquaintance with the squire of Scaleby Castle, many points in this obscure part of the history of the main branch of the Doves might be cleared up. Clearly the good offices of Richard Gilpin did much towards promoting this union between Curwen Hudleston and Eleanor Dove—a union unfortunately destined to be of short duration.

The pair no doubt betook themselves to Whitehaven shortly after the marriage at Scaleby, and continued to reside there until the end of December, 1745, when their son Wilfrid was born on the 19th of that month. I have heard it stated that Eleanor Hudleston never recovered from the effects of child-birth. It would appear that she died a few weeks after and was buried at St. Nicholas', Whitehaven, on 2nd February, 1746.† Thus

* *Extract from Camerton Register:* "1736, October 14. Mr. Curwen Hudleston clerk and Mrs. Elizabeth Cooke of Workington marryd."

† Owing to the uncertainty of the date between 1746 and 1747 there may be room for questioning the exact year of her death.

Curwen Hudleston became a widower for the second time, and so remained until his death in 1771 at the comparatively early age of 63.

We must now change the venue to Cullercoats once more and, in so doing, follow the fortunes of Mrs. Gilpin and her descendants. It can best be done by quoting part of a deed dated 1750. This is an indenture tripartite between Richard Gilpin of Scaleby, esquire, and Mary his wife, Sarah Dove of Scaleby, spinster, and Wilfrid Hudleston, son and heir of Eleanor, late wife of Rev. Curwen Hudleston of Whitehaven (1), the said Curwen Hudleston, guardian of the said Wilfrid Hudleston (2), and Christopher Spanton, of Monkseaton, gentleman, and Sarah his wife (3), being the draught lease granted by the first parties to Christopher Spanton and his wife of Arnold's Close, at Cullercoats, then in possession of Robert Layburn, and houses, cottages, etc., in the occupation of, etc., for sixteen years at the yearly rent of £10.

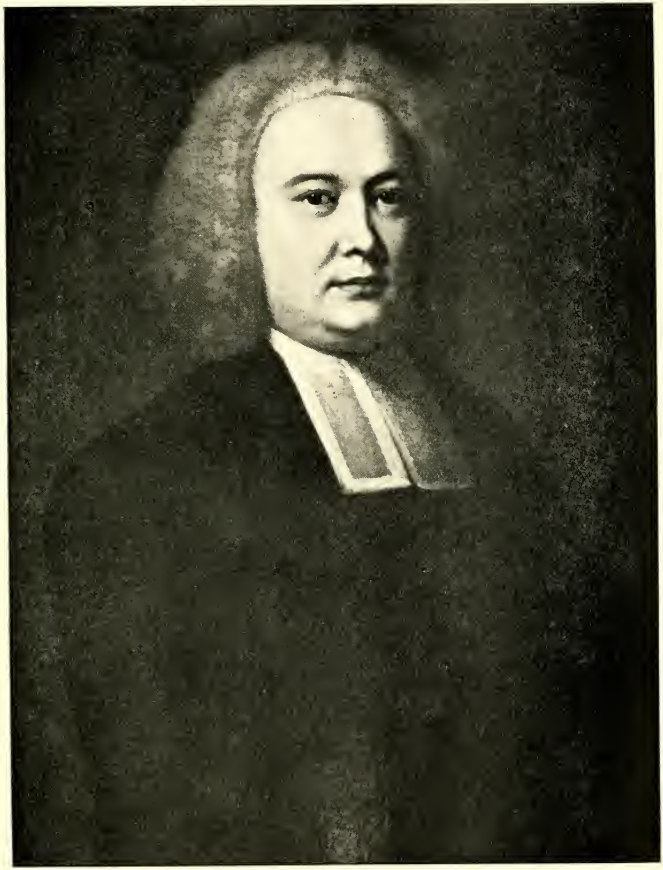
The above document brings us into contact with Cullercoats once more, and we perceive who were the parties beneficially interested in a portion of the Dove estate in the year 1750, namely, the widow of John Dove, through her jointure; Sarah Dove, her eldest daughter, and Wilfrid, the five-year-old child of Eleanor Hudleston (*née* Dove), deceased. It is noted that Sarah Dove had fifty-seven acres in Whitley in 1757; query, was this the same Sarah Dove as she who signed the above-mentioned deed?

There is a deed dated 11th May, 1748, which reveals rather a curious state of affairs. It seems that Richard Gilpin owed Curwen Hudleston £700, and Sarah Dove £528, secured on his estate at Scaleby. The mortgagees not deeming this sufficient security, he further mortgages all his freehold and copyhold messuages, etc., in the manor of "Tinmouth," to which he was

entitled in right of his wife; Curwen Hudleston to hold seven twelfths and Sarah Dove the remaining five twelfths. Sarah is here described as of Whitehaven. Six years later, namely, in 1754, we find that Richard Gilpin was dead, and that Curwen Hudleston was his executor, whilst Mary Gilpin, now a widow for the second time, in an agreement dated 25th March, 1754, is also described as of Whitehaven.* For some years after this she seems to have exercised proprietary rights at Cullercoats to the extent even of making use of the stones, etc., of the ruined pier for the purpose of repairs to her property. We find that Mrs. Gilpin was living in 1770, since Curwen Hudleston, in a letter to the Duke of Northumberland written in that year, speaks of his son's estate at Cullercoats as at present held in jointure by his grandmother. And he further adds that the offer of thirty years' purchase is as low as can be expected, *considering the claims of his grandmother and another lady during life.* So far I have no information as to the date of Mrs. Gilpin's death. Her name is not quoted by Jackson† in the list of burials at St. Nicholas' Church, Whitehaven. Since she was first married in 1710 and was still living in 1770, we may believe that she reached a good old age. The "other lady" was possibly Mrs. Spanton—Mrs. Gilpin must have been alive, and presumably resident at Whitehaven, so late as 5th July, 1770, since Andrew Hudleston, writing to his brother Curwen, urges that he should make certain enquiries from that lady. It seems

* 1754, March 25. Articles of agreement between Mary Gilpin of Whitehaven, widow, Sarah Dove of Newcastle-on-Tyne, spinster, daughter of the said Mary Gilpin by John Dove, late of London, grocer, her former husband, Rev. Curwen Hudleston of Whitehaven, clerk, and Wilfrid Hudleston, gentleman, an infant (aged 8¼ years), son of Rev. Curwen Hudleston by Eleanor his wife, deceased, another daughter of Mary Gilpin and John Dove (1), and Ralph Clark of North Shields (2), concerning the keeping in repair of a hedge on the west side of a lane leading from Whitley to Cullercoats.

† "The Hudlestons of Whitehaven, etc," *Trans. Cumberland and Westmoreland Ant. Soc.*, 1891.



REV. CURWEN HUDLESTON.

probable that her death took place between the above date and May, 1774, when there are admittances at Whitley in trust for the Rev. Wilfrid Hudleston.

The Hudlestons of Whitehaven.

So far as the family deeds inform us, there is a gap between 1754 and 1770, when Curwen Hudleston and his brother Andrew, the squire of Hutton John, began to move in the matter of the proposed sale of the Dove estate at Cullercoats to the Duke of Northumberland. This is a curious incident in the history of the Dove property, and the particulars are set forth at some length in Tomlinson's *History of Cullercoats*, etc.* The correspondence on this subject is reinforced by a letter from Samuel Lowthion to Mr. Andrew Hudleston, senior, of Hutton John, bearing the Newcastle postmark, and apparently dated April, 1770. He says:—"I am still in the number of the Friends. I went to Cullercoats and took the reports of some of the oldest people in the village, from whom I learned that it had been a harbour about 44 years (? ago) where about 30 colliers of about 230 tuns each were freighted with coal, two or three being loaded at one tide, etc., etc."

The correspondence was in fact commenced by the Rev. Curwen Hudleston on 12th March, 1770 (just about a year before he died), in a letter to the Duke of Northumberland. The writer alludes to his Grace's desire to treat with his son, and says that the offer made of the lands and houses at thirty years' purchase he is willing to accept. He then proceeds to dilate on the advantages of Cullercoats harbour in connection with the coal trade and suggests that coal might be worked under the sea as at Whitehaven.

* W. W. Tomlinson, *Historical Notes on Cullercoats, etc.*, p. 20.

This letter and others from Andrew Hudleston, of Hutton John, are very optimistic as to the prospects of Cullercoats. Unfortunately they were about a century too late. Andrew is very desirous that a survey should be made, "not only of the quay, harbour and sea-bank, but a detailed ground-plot of every house, etc., should be laid down, distinguishing leasehold from freehold, and the present occupiers, etc., with the various rents. Inquiries should be made as to the expiry of certain leases, etc." These were the ideas of the practical lawyer of Gray's Inn, and he especially requires a survey of Arnold's Close, with the site of the former saltpans. In his letter of 15th June, 1770, Andrew Hudleston, writing to Mr. Seymour, observes that "as to his nephew's estate at Cullercoats," the copyhold lands are let for £40, the freehold at £15, and the houses at about £42, in all £97 per annum. In addition to this, the advantage of coals in the freehold and the convenient harbour should be considered.

On the 28th June, 1770, the Duke of Northumberland, writing from Northumberland House to Andrew Hudleston, acknowledges receipt of letter offering to treat for his relative's estate at Cullercoats, which he (the Duke) is willing to purchase at any reasonable price. The Duke does not admit the privileges claimed with respect to the pier, and wishes for an inquiry into these matters. On the 5th July, Andrew, in a letter to his brother Curwen, traverses the position taken up by the Duke and especially enjoins him to enquire more particularly from Mrs. Gilpin before the brothers make any reply. On the 15th July, Andrew, in a second letter to the Duke, states what he believes to be the legal position of his kinsman, and quotes the deeds of Delavale, Wrangham, etc. On the strength of statements which must have emanated from Mrs. Gilpin, he assumes a position, which, in some respects, is scarcely justified by the facts already recorded. The statement that Mrs. Gilpin "still receives a small

acknowledgment from every fisherman there for the use of the harbour" was probably correct. They furthermore obtained the evidence of John Swallow, an old inhabitant, that the pier was reputed to stand on the ground of Mr. Dove's family, who have always exercised acts of ownership, and when the pier was thrown down, disposed of the stones in building houses at Cullercoats. Of the latter fact there can be no doubt, so far as Mrs. Gilpin was concerned. Thus ends the year 1770.

The following year (1771) was a notable one in the annals of the Hudleston family. Previously we have gathered from the correspondence that Curwen Hudleston was indisposed and had been in the habit of going to Bath for his health's sake. On the 27th February, Andrew writes to Curwen, in Whitehaven, on private matters and says "we are all concerned at the return of your disorder." Exactly that day month, namely, on 27th March, 1771, there is the following entry in the register of St. Nicholas' Church, Whitehaven: "The Reverend Curwen Hudleston, minister, buried." He was succeeded in the ministry of St. Nicholas' by his son Wilfrid, then in his 26th year. It is not without a certain degree of surprise that we hear of Wilfrid's marriage in the very same church on the 17th of the following June. Doubtless his father would have officiated had he been alive. The bride was Elizabeth, daughter and heiress of Thomas Airey of Egremont, who is described in the *Newcastle Journal* of that day as "an amiable young lady with a handsome fortune."*

Meanwhile negotiations for the sale of the Dove property at Cullercoats languished and Andrew writes to Mr. Seymour (26th August, 1771) to know how matters stood. Mr. Seymour, replying from Aldborough (his letter bears the Darlington postmark) on 1st October, observes that the Duke is ready to treat

* Maberly Phillips, *Arch. Ael.*, vol. xix., p. 125.

for the houses and grounds at Cullercoats belonging to "your nephew" (*i.e.*, the Rev. Wilfrid Hudleston, son and heir of Eleanor Dove), *but claims the harbour as his own.* "As you mention that you would send your deeds to your agent in London, and as soon as his Grace is acquainted therewith, he will give directions to have them look'd into, and will at the same time produce such deeds and evidences as will fully convince that your nephew can have no claim to that harbour." And thus the matter seems to have slept for two or three years.

In the spring of 1774 the question of perfecting the Rev. Wilfrid Hudleston's title to copyhold estates of the manor of Tynemouth was raised in a letter from Mr. French to Andrew Hudleston of Hutton John. Accordingly, on 11th and 20th May, the necessary formalities were gone through, and there is a notification of the surrender by John Cay of the copyhold property at Whitley to the use of Aubone Surtees in trust for the Rev. Wilfrid Hudleston. It is presumed from this that his grandmother, Mrs. Gilpin (Mary Hudson—Mrs. John Dove) was now dead, and that there was no encumbrance on the property.

On the 10th February, 1774, negotiations were resumed, and the battle of the Cullercoats pier and harbour was fought with renewed vigour, Andrew Hudleston again coming forward as his nephew's champion. The family deeds of the Doves were duly quoted, and he especially relied on the lease of 30th July, 1677, wherein John Dove I. and Thomas Dove II., both of Whitley, together with Ralph Hedworth, let a piece of land, etc., etc., to John Carr of Newcastle for ninety-nine years.* The marriage settlement between John Dove II. and Mary Hudson was also adduced as evidence. Andrew Hudleston like-

* See p. 17, *supra.*

wise did not fail to urge the advantages of Cullercoats in the optimistic vein of five years ago.

On 24th April, 1774, Mr. Lodge replies, on behalf of the Duke of Northumberland, and the following is an abstract of his opinion:—"So far from seeing a shadow of title to pier and harbour, the contrary appears on the face of his own abstract. In Ralph Delavale's grant, Arnold's Close is bounded by the sea, so evidently he conveys nothing but the close itself, so also in the grants of John Delavale to Thos. Wrangham, and of the latter and his wife to Thos. Dove. In the grant of John Dove to Thos. Dove his son in 1678, the lessors, so far from demising the pier, have cautiously described the premises as bounded thereby, and most certainly, if the pier had been their property, would have demised it by descriptive words. In the deed of 1683 the pier still continues the bounder and there is not a word showing any property in it of the lessor. In Mr. Dove's marriage settlement in 1710 he does indeed seem to have jumped into possession of the pier, but he might with equal reason have conveyed the manor of Tynemouth to his trustees."

Thus the parties continue to argue with increasing candour, and it seemed as though there was but little chance of their coming to an agreement. It is evident that the Rev. Wilfrid Hudleston had conceived a most exaggerated idea of the value of the property he had inherited from his mother. As the total amount, namely, £10,000, is, however, endorsed by his uncle in a letter to Mr. Clarke, dated 4th March, 1776, I venture to reproduce the estimate. In the above letter the uncle describes his nephew as "the honest parson."

The following particulars and estimate of the lands, etc., of the Rev. Wilfrid Hudleston at Cullercoats, were written on the 14th October, 1775, with the view of selling them to the Duke of Northumberland:—

	Contents. A. R. P.	Yearly Rent. £ s. d.
Freehold Close called Arnold's Close ...	8 1 0	15 0 0
Two Copyhold Closes called North and South Closes	26 0 17	40 0 0
A parcel of ground formerly enclosed for a waggon-way, now called Gilpin's Lane	1 1 14	2 0 0
Open ground in Cullercoats, very convenient for building upon. The Wharfes, Keys, Pier, and Harbour, Rocks and soil from High to Low Water Mark	7 1 9	
Present Rents of Houses in Cullercoats amount to about £60 a year ...		60 0 0
	43 0 0	£117 0 0
	A. R. P.	£ s. d.
Lands and Houses at 35 years purchase		4095 0 0
Coals in the Freehold premises at £100 an acre	15 2 9	1550 0 0
The open ground left in the Town for building upon, about		1000 0 0
		£6645 0 0
		£ s. d.
The Wharfs, Keys, Pier, Harbour, Rocks, and Soil from High to Low Water mark, wayleaves, and all other conveniences and appurtenances ...		3355 0 0
Total		£10,000 0 0

N.B.—Though the rents of the Houses at present amount to no more than what is above mentioned, there being several old Leases of several small pieces of ground, whereon Houses are standing, some already expired, and others near expiring, which in a few years will greatly add to the yearly value.

It will be noticed that in the above estimate the rental of the houses at Cullercoats is increased from the previous estimate

CULLERCOATS SALT-WATER BATHS

And its quay wall before the erection of the wooden Laboratory against the gable end to the left of Baths
(for the wooden Laboratory see facing p. 75).

of £42 to £60. The other items speak for themselves. No wonder that the sale was never effected. All correspondence seems to have ceased in 1776. Andrew Hudleston himself died in 1780, aged 77, and was buried in Graystoke Church on the 23rd August. He was Recorder of Carlisle, etc., and was succeeded at Hutton John by his son Andrew, who was likewise a barrister of Gray's Inn.

The Rev. Wilfrid Hudleston was henceforth in full possession of his mother's estate at Cullercoats and Whitley, but as a non-resident could have had but little communication with the inhabitants. In point of fact the representatives of the main line of the Doves have been non-residents ever since John Dove II. sold his mansion to Zephaniah Haddock, more than 200 years ago. Mrs. Gilpin in her day seems to have exercised considerable authority over the place, and left her mark in certain names which were in vogue up to the close of the eighteenth century. Thus we find on 20th April, 1798, a lease was granted by the Rev. Wilfrid Hudleston of Whitehaven to James Smith of Whitley, gentleman, of *Gilpin's Close* and *Gilpin's Worth* at Whitley, and Arnold's Close at Cullercoats, and certain messuages and waste ground at Cullercoats for fourteen years at a yearly rent of £100, less £5 for each of the first three years.

About this time, Mr. Hudleston removed from Whitehaven to the rectory of Handsworth near Sheffield—possibly in 1802.

Meanwhile the story of Cullercoats itself goes on somewhat uneventfully, especially during the latter part of the eighteenth century. All hopes of making it a shipping port had long since ceased, but it became famous as a fishing station, and to a less extent as a bathing-place. This led to a somewhat singular circumstance, which is best told by quoting a letter dated "Boldon, 22nd April, 1808," written by Richard Robinson to an unnamed correspondent:—"Sir," I have performed my promise

in copying the lease and sending it to you. Please to ask Mr. Hudleston if he gave any leave to Mr. Richard Armstrong to build the Baths below the South Banks at Cullercoats. If not, I think it necessary he should be informed they are built and been in use this last summer. Also that the sea banks have fallen in between Mr. Shipley's house and one belonging to him wherein Loff, who keeps an ale-house, lives; but more in danger of Mr. Shipley's house, owing chiefly to the poor inhabitants getting coals at a seam above the freestone in the Banks." We are not told how the Rev. Wilfrid brought Mr. Armstrong to book, but the bath-house must ultimately have come into possession of the owner of the soil, and it has remained as a family asset ever since. The bath-house existed for exactly a century, having been built in 1807, and pulled down in 1907 to make way for the Dove Marine Laboratory.

After the episode of the building of the bath-house there is very little to record as to the connection of the Hudleston family with Cullercoats. The Rev. Wilfrid Hudleston died and was buried at Handsworth in April, 1829, aged 84 years. He was succeeded by his son Andrew, who was christened in St. Nicholas' Church, Whitehaven, on the 3rd January, 1779.

Andrew Hudleston was a graduate to Trinity College, Cambridge, and subsequently D.D. He succeeded his father as minister of St. Nicholas' very early in the nineteenth century, and there continued to officiate until his death. He was buried on 28th November, 1851, at St. Nicholas' Church, aged 72—the last of his race who was buried there; and the last of three ministers who had been incumbents of St. Nicholas' for a consecutive period of over a century. He was unmarried. Andrew also held the living of Bowness on the Solway. His will is dated 29th January, 1851. Besides a considerable amount of personalty, he devises his property called Hoggit End, near

CULLERCOATS IN THE FORTIES.

From an Engraving by George Finlay Robinson.

A – End of Victoria Crescent. B—The Old Ship Inn. C—The Old Square. D—Dial House.
E—The headland on which the Cullercoats Wireless Telegraph Station is now located.

The Salt-water Baths are seen down on the foreshore.

Egremont, and Strudda Bank, near Calder Bridge, county Cumberland, and Cullercoats, near Tynemouth, to Mr. George Harrison and Mr. John Musgrave, both of Whitehaven, as trustees for his four sisters, Eleanor Ward, Elizabeth Hudleston, Joyce Watson, and Dorothy Hudleston. These ladies were granddaughters of Eleanor Dove. After their deaths, for his niece, Mrs. Elizabeth Simpson, daughter of his sister Eleanor. In accordance with the terms of the will the Tynemouth property was put up for sale in 1854 and bought for the chief beneficiary at the price of £4,850. The following particulars of sale attest the nature of the property at the above date:—

To be sold by auction (Mr. Brough), 8th August, 1854, at the Bath Hotel, Tynemouth:—

Lot 1.—Those valuable arable and pasture fields of a customary or copyhold tenure, situate in the township of Whitley, in the Manor and Parish of Tynemouth, and near to Cullercoats, in the County of Northumberland, now in the occupation of Mr. Bell, and called respectively:—

	A.	R.	P.
Burnfoot Close, containing	9	2	16
Corner Field	2	3	24
Sea View	13	3	16
Acres	26	1	16

From this property a varied and extensive view is obtained of the surrounding country, and also of the German Ocean, and it affords desirable Sites for Marine Residences, being adjoining to the highway leading from Tynemouth to Whitley, and part of the land having a considerable Frontage to the seashore.

Lot 2.—The old established Inn called the "Ship," situate at Cullercoats, fronting the Harbour there, and being within the Parish and Borough of Tynemouth, together with the Dwelling House adjoining, and the Barn, Stable, Outbuildings, Stack Yard, and Garden; also a Field adjoining, called Arnold's Close and part of Burnfoot Close, the whole containing 7a. 3r. 12p. This freehold land is eligible for Building Sites, and being within the Borough of Tynemouth, the Proprietors might acquire Votes for the Borough as well as for the county.

Lot 3.—The Bath-house, Dwelling House, Land, and Sea Banks of Freehold tenure, situate immediately in front of the harbour of Culler-

coats, and containing 3 roods, and 24 perches or thereabouts, with all rights and privileges appertaining to the sea banks and foreshore.

The bath-house is frequented by visitors for sea bathing; it is fitted up with hot, cold, and shower baths, and affords a desirable investment.

Lot 4.—The royalties of Coal, Stone and other Minerals, within the freehold portions of the said estate, situate within the parish of Tynemouth.

Resuming very briefly the history of Cullercoats, it should be stated that the pier was rebuilt in 1848, and in the interval which elapsed between the death of Dr. Hudleston and the acquisition of the property by his niece, an event occurred which caused considerable anxiety to the doctor's trustees. This was the building of the lifeboat house in 1852. The Committee acted very much after the fashion of Armstrong half a century before, that is to say, they erected a building without troubling themselves on whose land it was situate. Being for a public object, the owners might fairly condone the irregularity, and moreover the matter was not worth a contest, where the litigants would have to content themselves with a very poor shell, whilst the lawyers might swallow a substantial oyster.

In the management of the recently acquired property of the Doves, Mrs. Simpson let the land (13th February, 1858) to Henry Ogle Yarrow for £70 a year, reserving the right to enter Arnold's Close for the purposes of building. On the 30th November, 1859, the bath-house was let to Henry William Faweus for seven years at the rent of £20 per annum, damage by sea to be made good by the owner. This last was a very serious consideration, and it was only ten years afterwards, namely, in 1868, that a man could be found as tenant, capable of coping with the North Sea at his own costs and yet able to pay a rent of about

In an advertisement of the *Newcastle Chronicle* in June, 1855, setting forth the various attractions of Cullercoats at that date, it is said that—"There is excellent accommodation for bathers, the Haven having been greatly improved with a handsome stone pier." The salt water baths, also, appear to have been considerably renovated and improved in 1855.—J.J.L.

CULLERCOATS IN THE FIFTIES.

A.—The Old Ship Inn. B—The Old Square. C—Dial House. D—Clock House.

Down below are seen the Old Lifeboat House, and the roof of Salt-water Baths.

£16 per annum. This man was the late John Small, who for nearly forty years was tenant of the bath-house on the above terms, and who succeeded in keeping out the enemy to the last. All honour to his memory!

It might be interesting to know when and by whom the "Ship" Inn was built. This was a prominent feature of Cullercoats in the middle of the nineteenth century, when old Pratt and his wife could make their customers more comfortable than is the case in many a pretentious hotel of modern date.

On the death of the last of the Hudlestons of Whitehaven in April, 1867, Dr. John Simpson, his wife Elizabeth, and all their children assumed by royal licence the name of Hudleston. In October of that year Dr. John Hudleston died. In November, 1878, Mrs. Elizabeth Hudleston died, leaving all her real estate to her eldest son, Wilfrid, who thus inherits the ancient property of the Doves in Tynemouth parish. Since the death of John Dove II., about 1730, the main line has passed through three females to the present possessor. This would also seem to have been the case with the collateral branches, and thus the name of Dove, once so familiar at Cullercoats, is well-nigh forgotten.

Cullercoats and Marine Biology.

By PROFESSOR A. MEEK.

Wallis, in his *Natural History and Antiquities of Northumberland* (1769), mentioned particularly two eminent physicians of the sixteenth century, William Turner and Thomas Gibson. The former wrote a book on Birds and a book on Botany, and contributed (*anno* 1557) besides to Gesner (Liber iv.), "an account of the river and sea fishes observed by him in Northumberland." Dr. Turner died in 1598. Thomas Gibson was renowned as a physician, and he wrote also on plants.

Wallis himself gave an account of the topography of the county, of the minerals and fossils which were known to him, of the trees and plants, and of the animals. Amongst the "fishes" he mentioned certain Cetaceans which had wandered to the coast, and he stated that bottle-nose whales were sometimes observed in great numbers. "Sixty-three of them came in shore at Shoiestone, 29th July, 1734." The porpoise was, as it is nowadays, the common species. He gave a list of some 28 sea fish and 11 fresh water fish, accompanied by interesting notes relating to each. The crab and lobster were similarly described, the common and heart urchins, and a catalogue of the Mollusca was added. In one or two cases observations were recorded with regard to the food of the fish.

The year 1793 saw the birth of the Literary and Philosophical Society* of Newcastle-upon-Tyne, and the beginning in con-

* Dr. R. Spence Watson, *The History of the Literary and Philosophical Society of Newcastle-upon-Tyne*, 1897.

THE PUBLIC AQUARIUM.

nexion therewith of a period of remarkable progress in Natural History and in educational activities in general. The MS. papers relating to the early meetings preserved in the Society's Library show that Marine Zoology was not neglected. On 8th April, 1794, a communication from Ralph Beilby—the engraver to whom Thomas Bewick was apprenticed, and who afterwards received Bewick into partnership*—was read, giving a description with a drawing "of an uncommon fish taken up dead near Newbiggin." The drawing is not very satisfactory, but there can be little doubt that the fish was a Bank's Oar Fish (*Regaleeus banksii*). The Rev. W. Turner, who took a prominent part in the formation of the Society, contributed a paper on *Lepas anatifera*, a stalked barnacle which is still frequently cast ashore on floating timber and on weed. An interesting paper by the Rev. W. Salvin on Ocean Currents gave an account of what was known at that period on Hydrography.

Winch's collection of plants, birds, and other objects of a like nature, coins, and geological specimens, formed the nucleus of a museum which soon attained a position of importance. Much interest was created by the acquisition of two Australian animals, a wombat and an ornithorhynchus (*vide* Bewick's *British Quadrupeds*). From New South Wales a collection of plants was also obtained. In 1823 the Wycliffe collections were purchased by the Society, and further valuable gifts of specimens were received, especially of an exotic nature. After being thus enriched and rearranged the museum was opened in 1825. But soon after—in 1829—the members who were interested in Natural History formed themselves into a Society—The Natural History Society of the Counties of Northumberland, Durham, and Newcastle-upon-Tyne. In 1834 the collections were placed

* It was during this partnership that Bewick produced his *History of Quadrupeds* and his *History of British Birds*.

in a special building which had been erected by the Natural History Society on ground purchased from the parent Society The museum collections remained in this—the "old" museum—until 1884, when they were removed to the Hancock Museum at Barras Bridge. During the period which has intervened since the removal, important additions have been made to the collections, and because of the value of these—notably of the local and type specimens—and the general excellence of the display, the Museum now occupies a prominent position amongst institutions of the kind in the country.

The members who were interested in matters antiquarian had already (1813) instituted the Society of Antiquaries. This Society met in the rooms of the Literary and Philosophical Society until 1855, when they entered into possession of the Castle.

In two quarto volumes the *Transactions of the Natural History Society of Northumberland* during the years 1829-1838 are recorded. P. J. Selby of Twizell House, Dr. Johnston, Berwick, both strongly identified with a society presently to be mentioned connected with the Border Town, N. J. Winch, W. C. Hewitson, and others who were to become famous in the ranks of still another Newcastle Society of Naturalists—the Tyneside Field Club—were among the original members.

Dr. George Johnston, of Berwick, who contributed papers on Marine Zoology, notably one on Zoophytes, to the volumes just mentioned, was mainly instrumental in forming a Society, which has had a long and useful career and is still carrying on its work—the Berwickshire Naturalists' Club. The Club was instituted in 1831, and commenced publishing a series of transactions which were collected into volumes under the title "The History of the Berwickshire Naturalists' Club." The early volumes contained important and classic papers by Dr. Johnston relating more particularly to the marine fauna and flora of Berwick Bay

and the neighbourhood. This eminent naturalist contributed also catalogues of the Cirripedia, Acarides, Mollusca, and Fishes of the Berwick district. R. Embleton, another physician, similarly brought Embleton Bay into prominence by papers dealing with the marine fauna, more especially the Crustacea, of the Beadnell region. Reports with statistics relating to the Tweed Salmon Fisheries were given periodically. An account of the White Fisheries of the coast of Berwick was contributed to the first volume by the Rev. R. Cowe. Notes on the occurrence of rare fishes were made by Dr. Johnston, and by Embleton, and in later years by George Bolam. W. Baird published in the History several papers on Entomostraca. In 1888 (vol. xii.), a catalogue of the Marine Algæ of Berwick was published by E. A. L. Batters. The later volumes contain several important papers by Dr. James Hardy. The History gives a vast amount of antiquarian lore relating in many instances to Northumberland.

The success which had attended the Berwickshire Club attracted the attention of some of the members of the Newcastle Natural History Society. It was felt that there was room for a society, one of the objects of which should be to arrange excursions for the members to places of interest in the neighbourhood of Newcastle. The result was that a meeting was called and the Tyneside Naturalists' Field Club was established on 25th April, 1846. The Club rapidly became an important union of all the naturalists of the Newcastle region. In its ranks were included many of the members of the Natural History Society and others to whom the larger subscription of the original society was a matter of moment. The two societies worked together in friendly association up to the year 1864, and during these years the Field Club published the *Transactions of the Tyneside Field Club*, the Natural History Society contenting

itself with an annual report indicating more particularly the growth of the museum and the library. In 1864 the two societies entered into a more intimate union, and the proceedings were published thereafter under the title, *Natural History Transactions of Northumberland, Durham, and Newcastle-upon-Tyne.*

At the time of the formation of the Club in 1846 the attendance at field meetings was not a matter of ease. The general arrangement was that the members should meet at an inn near the scene of operations for breakfast, proceed with the business of the day, and should afterwards have a meal and a meeting when those who had anything to report on the progress of their work had an opportunity of doing so. On 7th August, 1846, a communication was read from Dr. Johnston, Berwick, proposing a joint meeting of the two Field Clubs at Alnwick, "as soon as the Newcastle and Berwick Railway shall be opened."

At the first meeting of the Club after its inauguration it was determined to form and publish lists of the various natural products of Northumberland and Durham, and an account of the geology of the district, with collections, which were to be placed in the Newcastle Museum. How well these objects were kept in mind, and how admirably they were carried out can best be appreciated and understood by consulting the Transactions published during the last sixty years, and by a visit to the Newcastle Museum.

Joshua Alder, who had previously described the land and fresh water Mollusca of the Newcastle neighbourhood in the Transactions of the Natural History Society, turned his attention to the Mollusca (including Ascidians) of the sea. He was joined by J. H. Fryer, and by Albany Hancock, and through their joint labours an exhaustive catalogue of the Mollusca was compiled. Many of the specimens were obtained from Cullercoats rocks and from Cullercoats fishing boats. Joshua Alder and Albany

Hancock were thereafter associated in the work on Mollusca which especially brought them into prominence as naturalists of the front rank. It is only necessary here to state that a great deal of the material for their classic monograph on Nudibranchs, and also for the work on Ascidians recently published by The Ray Society after being edited by Canon Norman, was obtained at Cullercoats. R. Howse, who was for so many years the curator of the Museum, added fresh facts and records relating to the Mollusca.

In 1858, Alder, in the third volume of the Transactions, catalogued the Zoophytes of Northumberland and Durham (Hydrozoa, Actinozoa, Polyzoa), and he made additions to the list in subsequent years. This work again refers largely to observations made at Cullercoats.

G. S. Brady began the important work which he was to carry out in connexion with the Club by contributing a catalogue, followed by supplementary lists, of the Marine Algæ. But he gradually relinquished the botanical side as he began to prosecute more and more his researches on Crustacea, especially Entomostraca. Many of his papers are printed in the Transactions.

His brother, H. B. Brady, devoted his attention to Foraminifera, and catalogued the local Foraminifera for the Transactions.

Several papers on Crustacea were contributed by Canon Norman, who also did a good deal of collecting at Cullercoats. The lists he has published of the contents of the Museum Normanium contain many references to Cullercoats and Northumberland, and in his recent paper on the Podosomata, many of the records will be found to refer to Cullercoats.*

The papers and catalogues by George Hodge dealing with Echinoderms, Pycnogons (Podosomata) and other forms obtained

* *Jour. Linn. Soc.*, 1908, vol. xxx., p. 198.

at Seaham Harbour, and also at the dredging trips, are full of interest.

The opportunity for extending the field of observation by dredging operations was obtained by a succession of grants from the British Association. Dredging apparatus was procured, and a steamer employed. Such of those among the members who felt they could face the sea, and some who could not, took part. The results were very successful, and the reports, with lists of the various groups, are very important. The annelids were sent to Professor McIntosh, St. Andrews, and he furnished a list which is printed in the Transactions.

Exhaustive Meteorological reports were made from year to year. Many of them were edited by the Rev. R. F. Wheeler, vicar of Cullercoats.

While the work which has just been sketched with regard to Marine Zoology was being proceeded with, the land animals and plants were being similarly dealt with, and the geology and palæontology were in capable hands. It is not altogether outside my present purpose to point out also that the Transactions give evidence of the importance of the geological features of Cullercoats, and they contain lists of the fossil fish which have been found in the Permian Marl Slate at the base of the Magnesian Limestone of Cullercoats harbour and of Marsden quarry.

Observations of general interest in Marine Zoology were recorded from time to time in the Transactions, and attention may be drawn to some of them.

Albany Hancock described a Bank's Oar Fish (*Regaleeus banksii*) caught by Bart. Taylor at Cullercoats in March, 1849. He gave accounts likewise of the burrowing barnacle which he discovered, *Alcippe lampas*, and of burrowing sponges (1864). In vol. iv. (1858-60) Albany Hancock gave an interesting

account of the tracks made by certain Amphipod Crustaceans in the sand at Cullercoats and neighbourhood, and compared them with so-called fossil worm casts. He described at length the nesting habits of *Gasterosteus aculeatus* and of *Gasterosteus spinachia* in the Transactions for 1852. The letters which Charles Darwin wrote to Albany Hancock in relation to Cirripedia were published in the Transactions in 1884.

Dr. Dennis Embleton, of the Medical School of Newcastle, contributed several papers, and there is little doubt that he influenced his colleagues in the Club to enquire into structural detail. He described a small sunfish which was caught off Cullercoats in September, 1849.

R. Howse recorded Molluscan rarities in a succession of notes, and in vol. v. (1860-62) he drew attention to the southward march of *Acmaea testudinalis*. In 1856 George Tate, in a paper on the "Natural History of the Farne Islands," published in vol. iii. of the *History of the Berwickshire Naturalists' Club*, gave a list of Mollusca, stating that "many of the specimens were gathered by Grace Darling on or about the Longstone." The collection contained one example of *Acmaea testudinalis*. In 1860 Mr. Tate, adverting to this record, said that the earliest notice he could find as to the occurrence of the Mollusc on the east coast of Britain was in the *Naturalist* for 1851, wherein one specimen was recorded as having been obtained in the Bay of Nigg, Aberdeen. "Since that time Mr. Dickie reports it in 1857 as abundant in Aberdeenshire;* Mr. James Hardy in 1859 found it at Cockburnspath; Mr. Wm. Boyd has this year taken several specimens near low water mark from the rocks at Spittal, south of Berwick, and more recently it has been found at North Sunderland." Bearing in mind the exploration which had already

*The species was not mentioned by Macgillivray in *A History of the Molluscous Animals of the Counties of Aberdeen, Kincardine and Banff* (1843).

taken place on the coast of Northumberland, the following further quotation from Mr. Tate's paper gains in interest:—"Mr. Albany Hancock in 1859 records it from Whitburn, and states that in September of 1857 he took three specimens after much searching at Roker, which is the most southern locality for it as yet known on the east coast."* It has been known in Yorkshire for many years, and Canon Norman, this year (1908), has stated that so far as he is aware "it is not known further south than the Yorkshire coast, where it has reached Scarborough and its neighbourhood."†

The sailing trawlers which began to work off the coast in the fifties began to attract attention. R. Howse, in vol. v., said that "going on board a trawl boat in 1858 I was surprised to see a large basket full of Goniaster and two bushels of Nephrops." Several others among the contributors to the Transactions about this period were equally surprised to see that Nephrops, which up to that time had been considered a Crustacean rare in the district, was now landed in numbers from the trawlers. *Nephrops norvegicus*, the Norway lobster, locally the "prawn," has been well known in the Tyneside region since that time. It is caught by the steam trawlers in large quantities on the soft ground off the coast. We have found it convenient to make Nephrops our type of Crustacea for the first year's course in Zoology at Armstrong College instead of the fresh water crayfish.

In vol. vi. (1863-4) the Rev. G. C. Abbes contributed a paper drawing attention to the complaints the fishermen were making as to the effects of trawling.‡ The Transactions (vol. vi.) con-

* *Hist. Berwk. Nat. Club*, vol. iv., pp. 213-4.

† President's Address, *Herts. Nat. Hist. Soc. and Field Club.*

‡ See also the Reports of the Royal Commissions which were appointed to enquire as to the state of the sea fisheries of the country, and which consider evidence relating to Cullercoats; and *The County History of Northumberland*, vol. vii.

THE LECTURE ROOM.

tain a paper by the Rev. R. F. Wheeler, vicar of Whitley, on "The English Sea Fisheries," and J. F. Spence and G. S. Brady both refer to the subject in their presidential addresses to the Club. In vol. viii. an account is given of shrimping, which then took place in the Tyne in the neighbourhood of Newcastle, and even higher up the river.

In June, 1884, a shoal of small tunnies came off the Tyne. Many of them were caught in the salmon nets of the Cullercoats fishermen. They were only got during one night. A large example was caught in a salmon net at Frenchman's Bay in the following year.

In 1890 Howse contributed a catalogue of the Fishes of Northumberland and Durham, and an appendix thereto in the succeeding volume.

Another naturalist of the same period is referred to in the *Transactions of the Field Club*, vol. iv. (1858-60) at pp. 198 and 321—Arthur Scott Donkin, M.D. (died 1883). He made a special study of Diatoms, and he contributed a paper, among others, on the Diatoms of the Northumberland coast to the *Transactions of the Microscopical Society*, vol. vi. John van Voorst brought out his Natural History of the British Diatomaceæ, illustrated by West, but only three parts were issued.

This sketch was necessary to show how much local and general Marine Zoology owes to the brilliant group of naturalists who were connected with the Natural History Society and the Tyneside Field Club. It was at Cullercoats that much of the work was done, and it is important to remember that we possess in the volumes we have been considering, a record, and sometimes a succession of records of the common, the new, and the rare animals during a long and interesting period.

About the middle of last century there was a society called the Tynemouth Natural History Society. It is more than likely

that the collections of birds, plants, etc., the remains of which are still in existence in North Shields, owed their origin to this Society.

Reverting once more to the Literary and Philosophical Society, and that interesting corner between Collingwood Street and Orchard Street, we have to note that after several attempts to introduce lectures on medical subjects at the Literary and Philosophical Society, the Newcastle-upon-Tyne School of Medicine and Surgery was begun in 1832. For the first two years it was located in Bell's Court. It was then removed to the "Hall of the Worshipful Company of Barber Surgeons, together with Wax and Tallow Chandlers," and here the museum was gradually formed. The School progressed until 1851, when an unfortunate disagreement took place, resulting in the formation of two rival schools with the names, "Newcastle-upon-Tyne College of Medicine" and the "Newcastle-upon-Tyne College of Medicine and Practical Science." The former in the same year became connected with the University of Durham, and had that fact added to the title. The two Schools of Medicine were reunited in 1857. A still closer union with the University was effected in 1870, when the College adopted the title which it still retains—the University of Durham College of Medicine. It was in 1851, owing to the needs of the North-Eastern Railway at Manors, where the Medical School was located, that a College was built next to the Literary and Philosophical Society behind Westmoreland House, which at this time also was pulled down and replaced by the building occupied by the Mining Institute. Up to the end of the eighties there were grouped round the building occupied by the Literary and Philosophical Society, the oldest of them all, the institutions which mainly represented the intellectual and educational activities of the period. These were: the Mining Institute, the Museum of the Natural History

Society, the College of Medicine and the more recently formed College of Science. The further developments of the North-Eastern Railway in connexion with the Central Station was the principal reason for the dispersion of three of these to the sites they now occupy, the two which remained being the Literary and Philosophical Society and the Mining Institute. The College of Medicine was removed to Northumberland Road in 1889.*

During the period when the College of Medicine and the Natural History Society were neighbours, some of the collections of the former served to enhance the museum of the latter. At the time of the general removal the specimens belonging to the College, including many valuable skeletons, were taken possession of by the College. Many of them now serve to enrich the Comparative Anatomy section of the museum in the Zoological Department of Armstrong College.

The Mining Institute has already been mentioned. To give it its full title, the North of England Institute of Mining and Mechanical Engineers was founded in 1852, and the fact is stated because it was in connexion with the Institute that the idea was first advocated to establish in Newcastle a College for Mining and Science.† It was not until 1871, however, after many meetings, that the co-operation of the University of Durham was secured, and a sum deemed necessary raised to permit of the Durham College of Physical Science being founded. There were at first four chairs—Mathematics, Chemistry, Physics and Geology. The Professors were provided with rooms in the Mining Institute, in the College of Medicine, in greenhouses belonging to the Literary and Philosophical Society, and in

* Dennis Embleton, *The History of the Medical School*, 1890.

† G. A. Lebour in Fowler's *History of the University of Durham*, 1904.

what were practically the cellars of the Wood Memorial Hall. The first wing of the present College was built in 1888, two additional wings were opened in 1894, and the front wing in 1906, when the name was changed to Armstrong College. A chair in Biology was established in 1874, and H. Alleyne Nicholson, M.D., D.Sc., was the Professor in 1874-75. He was followed by G. S. Brady, M.D., LL.D., D.Sc., F.R.S., who was Professor of Natural History until 1906, when he retired, with the title, Honorary Professor. A separate chair in Botany was created in 1893, when Professor M. C. Potter, M.A., F.L.S., who had before held the Lectureship in Botany, was elected, and he still occupies the position.

What is now the Department of Zoology was lodged originally in rooms in the Mining Institute. A corridor in the Hancock Museum housed it with the Departments of Botany and Agriculture for several years. When the second wing was finished and rooms provided for Geology and Mining, the Department was removed to a temporary building, which had done duty before at the Jubilee Exhibition. During the time of building the front wing a room was provided for Zoology in the Chemical Department. Since 1905 it has been lodged in a fine suite of rooms in the front wing. The new Marine Laboratory Department is connected with the Zoological Department, and the Professor of Zoology is Director of the Laboratory.

We have now to look at another change, which had still more directly, however, to do with the foundation of the Marine Laboratory at Cullercoats—or rather two changes. They were the formation of the Sea Fisheries Committees in England and the creation of the Technical Education Committees. The Northumberland Sea Fisheries Committee was formed by an order of the Board of Trade, dated 20th March, 1890, made under the provisions of the Sea Fisheries Regulation Act, 1888.

The Technical Education Committee of Northumberland began its work in 1891.

Under the auspices of the latter, lectures were given by Professor J. Cossar Ewart, of Edinburgh University, and by Dr. Gregg Wilson (now Professor of Zoology in Queen's College, Belfast) at the various fishing villages on the coast. The latter also, at the instigation of the Sea Fisheries Committee, made enquiries regarding the crab and lobster fisheries. C. Williams, the secretary of the Technical Committee, now the Education Committee of Northumberland, wrote on the visit of the members of the Sea Fisheries Committee to the Hatchery at Dunbar. W. King, who managed the Budle Bay Mussel Farm, contributed a paper on the cultivation of mussels. These papers were published by the Sea Fisheries Committee. Alderman John Dent at this period began to experiment with a beam trawl in the inshore waters. The experiments were started in 1892; in 1895 Mr. Dent was helped by a student of the College; and in 1896 the experiments were placed in my hands. Mr. Dent published reports on the results up to 1895, and since then an annual Report on the Scientific Investigations has been issued by the Northumberland Sea Fisheries Committee.

Alderman Dent, who was vice-chairman of the Committee, and eventually the chairman until his death in 1907, took a keen and practical interest in fishery matters generally. He provided the steamer and the gear for the trawling experiments, and on very many occasions the steamer was made available for dredging expeditions as well. In my first report to the Committee I pointed out the desirability of establishing a Marine Laboratory for the study of Marine Zoology and problems relating to the sea. The idea appealed to Mr. Dent at once, and he caused to be built at Cullercoats in 1897 a small but well-equipped Laboratory on a site adjoining the bath-house. It was

fitted with tanks, and an arrangement was made whereby a constant supply of water was obtained from one of the store tanks of the baths.*

For a number of years the reports dealt chiefly with the results of the trawling experiments, the food of the fish, plankton, the mussel resources, the crab and lobster fisheries, and the condition of the Northumberland Fisheries generally. Through the Education Committee opportunities were obtained for conferences with the fishermen, and the results of these were published. In 1899 and 1900 G. P. Bulman contributed lists of Mollusca. These were continued by Miss M. V. Lebour, M.Sc., who has since published valuable papers on "The Mussel Beds of Northumberland," and on local "Trematodes." Professor F. J. Cole, B.Sc., utilised the Laboratory to collect material for his monograph on Myxine. In the early days of the Laboratory's history R. Howse was a frequent visitor. Professor Brady also often came to Cullercoats. He contributed lists of the Copepoda, etc., obtained at the trawling and dredging expeditions. W. T. Gibson, who was for some time curator of the Millport Marine Biological Station, worked during several years at the Cullercoats Laboratory. W. H. Young, F.L.S., F.Z.S., catalogued the Marine Algæ. Mr. Dent wrote a paper on the food of the Sea Trout. The advanced students of the Zoological Department of the College availed themselves of the advantages offered by the Laboratory to become acquainted with the local marine fauna, and some of them afterwards worked at or in connexion with the Laboratory. Miss Lebour has already been mentioned. The late E. P. Witten, B.Sc., began an interesting investigation into the changes which accompany ecdysis in the crab, and the results were published. Charles Dodd, B.Sc., now of the Wesleyan College, St. John's, Newfoundland, worked in

* Report for 1897.

THE LABORATORY.

the Laboratory on the growth of the crab. Miss A. M. Carr, B.Sc., has published papers on the food of the fish caught off the north-east coast. The papers by myself include attempts to catalogue various Crustacean groups, viz., Mysidae, Cumacea, Amphipoda, and Decapoda, and I have reported additions to the catalogue of fishes made by Howse. The Report for 1904 contains a paper on the "Crab and Lobster Fisheries of Northumberland," wherein the results of all the previous observations are brought under review. The White Fisheries are considered in similar manner in the succeeding Report. During the later years also the experiments in migration have yielded important results with regard to the crab and lobster, and the flatfish. A catalogue of the fishes of Durham and a catalogue of the fishes of Northumberland have been published in the *Victoria* Histories of these counties, and a history of the Fisheries of Northumberland in the *County History*. A small Sunfish, captured at St. Mary's Island, gave an opportunity for describing the ear of that species.*

The Laboratory (for view of this, see facing p. 75), unfortunately, came to an end by fire on March 28th, 1904, when many valuable books, notes, apparatus, and specimens were destroyed.

An appeal was issued for funds to build a new laboratory but the sum which was aimed at—£2,000—was secured by an anonymous donor offering to subscribe the balance. The Committee met to decide upon a site, and it at once became apparent that the position occupied by the old baths-house, where the first Laboratory was situated, offered many advantages, such as being in Cullercoats harbour, near to the beach, and in close proximity to the rocks, which were known to be rich in much of the material which would be required. The owner, W. H. Hudleston, Esq., M.A., F.R.S., was approached, and he agreed

* *Anatomischer Anzeiger*, Bd. 25, 1904.

to build a laboratory. It was arranged that the laboratory should become a Department of Armstrong College, where a Marine Laboratory Committee has been formed representing the College, the Northumberland Sea Fisheries Committee, and the Northumberland Education Committee. The building, with the quay wall, cost the late Mr. Hudleston over £4,000, and the furnishing, the electric lighting, the provision of tanks and pumps and pipes rendered it necessary for the Committee, on the part of the College, to issue a fresh appeal for about £600. This was again well responded to, but the Committee had for the second time to thank the anonymous donor, already mentioned, for a large subscription.

The Laboratory was opened on September 29th, 1908, by His Grace the Duke of Northumberland, the late Mr. Hudleston being in the chair.

The Architect, Mr. Lish, has contributed a section in this book on the building, but I may briefly add here to his account a note respecting some of the features. The Laboratory is designed entirely for research. The room styled "the Laboratory"* is provided with six tables separated by partitions, and two of these are completed to form private rooms.† A third private room adjoins the Laboratory. The specimen room, in addition to the shelves and cupboards and drawers, possesses a table for two workers. There is, in addition, opening from the Laboratory, a well furnished library and a store room for reagents, etc. The Laboratory tables have teak tops, and there is an iron-sheathed table for the paraffin baths. Each worker has a table, cupboard and drawer, shelves, and sink with hot and cold fresh and salt water. Microtomes are provided.

In the private aquarium there are 38 shallow concrete tanks, and a concrete table for experiments and for glass aquaria. The

* See Plate facing p. 70. † See p. 78.

THE PRIVATE AQUARIUM.

tanks, as will be seen from the plans (see p. 76), are arranged in six rows, and they may be used in series of as many as are found to be convenient for each class of work. Each tank is fitted with a paddle to agitate the water when required, the power being obtained from a tip bucket supplied by the water entering the room—the water being thereafter passed into the tanks in a filtered or an unfiltered condition as wanted. Two of the wooden tanks from the old laboratory have been brought into use in this room. They are connected with the concrete tanks above mentioned by a long trough, so that larvæ, for example, may be led to any of the rows of tanks. The room is, therefore, well equipped for storing material for research, for embryological work, for experiments in hatching, and for infection and physiological experiments. A small tank is provided for photography opposite a window which can be opened completely. The waste water is carried away by surface drains in the concrete floor.

The main features in the public aquarium* to which attention may be directed are the arrangements concerned with draining the tanks. Each tank drains into a wide straight tube in the partition wall, and the tanks may be connected in series if required. All the tubes discharge into a large open drain underneath the tanks. This in itself is a large tank running round the three external walls of the room, and it is connected with the floor tank by a short wide tube; it may also be discharged when required directly to the exterior. The floor pond, as will be evident from the plans,† discharges by a wide, deep channel to the outside of the building. The arrangement in effect is that there are practically no pipes within the aquarium.

The electric pump, which supplies the Laboratory with sea water, is driven by a 5 H.P. motor deriving its current from the Tynemouth Corporation Electric Supply. It is controlled

* See Plate facing p. 56. † See p. 76.

by switch-gear and a speed regulator contained in an iron case placed in a convenient position. The motor, which runs at 1,600 revolutions per minute, is coupled directly to a special form of turbine pump. The water is drawn from a point in the harbour 110 yards away and 27 feet below the pump level. The pump delivers into tanks overhead at the rate of 7,200 gallons per hour, and into a tank on the roof of the building at the rate of 4,800 gallons per hour.

For advice with regard to the pump, electric lighting, and the installation of paddles in the private aquarium I have to thank my colleagues, Professor Thornton, Dr. Morrow, and Mr. Firth.

A word about one other society, the Northumberland Coast Club, which was formed in 1899. The meetings are held at Cullercoats, and the members take part in excursions to various parts of the coast and for dredging purposes. Arrangements have been made for the winter meetings of the Club being held in the lecture room of the Laboratory, and for the accommodation of members working at Marine Zoology.

The Laboratory equipment includes also a boat, the "Mysis," and dredges, tow nets, etc. Since the opening of the Laboratory a motor boat, the "Evadne," 50 feet long, 11 feet beam, furnished with a Gardner engine of 30 H.P., has been built from designs by F. H. Alexander, Lecturer in Naval Architecture, Armstrong College. It has been presented by the anonymous donor, whose kindness has thus enabled the College to connect with its Zoological Department a Marine Laboratory, and to provide it with an equipment worthy of the district and worthy of the work which it will be called upon to undertake.

CULLERCOATS BAY FROM THE SOUTH.

Showing the wooden Laboratory against the gable end of Salt-water Baths after the fire of March 28th, 1904. On the high ground to the left is Victoria Crescent, to the right of this the Hudleston Hotel, the Fishermen's Look-out House, Clock House, etc., and below the Look-out House is seen the new Lifeboat House (for front view of the Salt Water Baths see facing p. 50).

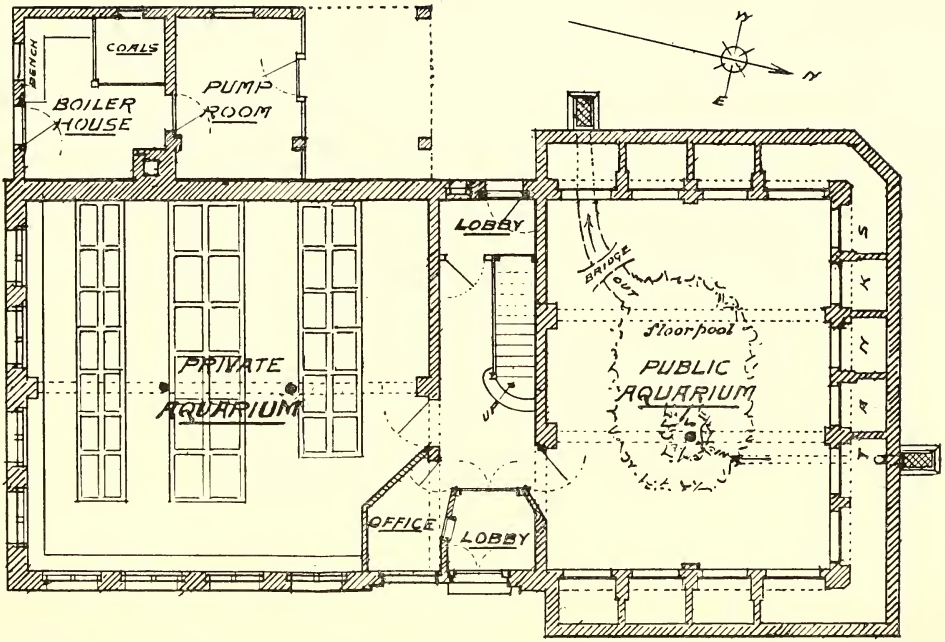
The Dove Marine Laboratory, Cullercoats, and its Structural Details.

By J. J. LISH.

The new Laboratory occupies the site of the old baths, recently pulled down, which were erected in the year 1807, thus having been in existence for exactly 100 years.

The natural beauties of Cullercoats bay appeal strongly to all, situated as it is on an interesting geological formation, but what the architect of the proposed new building had to do, before commencing building operations, was to ascertain the condition of the ground overlying the upper rock formation, and to take such measures as seemed needful to secure the safety of the heavy structure about to be erected.

Age had told upon the woodwork of the old quay wall, which bounded the site along the sea front to the east and south, and acted at the same time as a retaining wall to secure the ground behind; but owing to the extremely dilapidated condition of its wooden piles and sheeting, it was seen to be necessary to erect an entirely new quay wall in its place, but one of more substantial and permanent nature to meet the new conditions; in fact, a wall which would hold the quay and foundations of the new building secure for a period as long as the proposed Marine Laboratory might be expected to be in existence. For this purpose, after much consideration, a carefully designed structure



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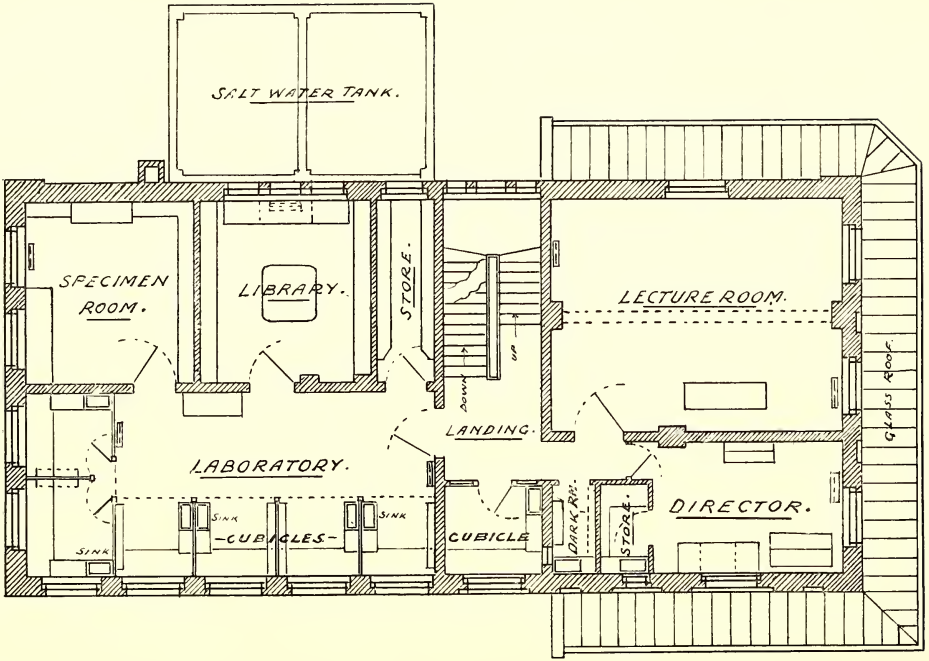
— GROUND PLAN. —

J. J. LISH
ARCHITECT
Newcastle upon Tyne.

of reinforced concrete resting upon reinforced concrete piles, driven down to the underlying rock, was determined upon. The section of this wall is in the form of the letter L , the upright portion forming the "curtain" or wall proper, whilst the horizontal portion is the "slab," which, when opposite the highest portions of wall is about 9 feet wide, and the position of this slab is generally from 4 to 5 feet below the normal surface of the adjoining sand. The horizontal slab, which is continuous throughout the whole length of wall, is connected to the curtain or upright portion by buttresses filling in the space from the extremity of the horizontal slab to the top of the curtain wall, as shown by the dotted line, at distances generally of 9 feet or 10 feet apart; the curtain portion of wall being directly over—and resting upon—the heads of the ferro-concrete piles. The whole quay wall structure is reinforced with steel so designed as to take up all the tensile stress and shear which may be developed in any portion of the work.

From the ground plan it will be seen that near the centre of the east front, on the ground floor, is the principal entrance to the building, leading through a lobby to the entrance hall and staircase. To the right on entering is the Aquarium, and to the left, the office and private aquarium.

The Aquarium is 30 feet by 23 feet (for view of this see opposite p. 56) and ranged outside of this are eleven fish tanks of varying sizes projecting beyond the main walls of the building, so as to secure direct vertical light and to obviate shadows. In the centre of the Aquarium is a spacious floor tank or "pool," with a rockery and fountain, and rock work is intended to be ranged round this pool to break up the rigid lines of the margin. A gallery, supported on brackets, runs round three sides of the Aquarium, giving access to the tanks for the purposes of feeding, supervision, etc., and at the same time acting as a screen



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— FIRST FLOOR PLAN. —

J. J. LISH.
ARCHITECT.
Newcastle upon Tyne.

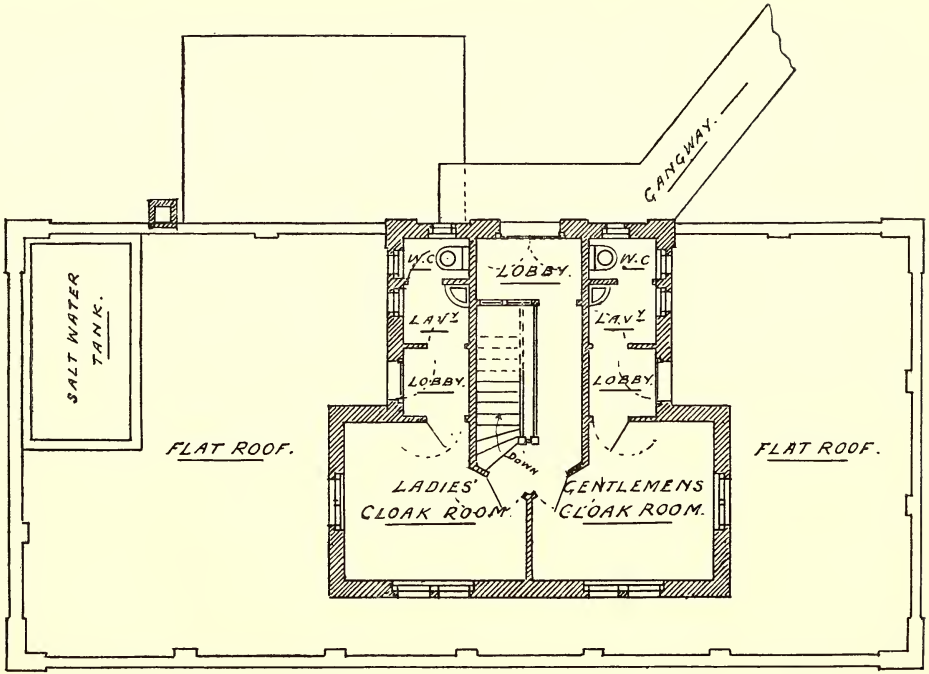
to prevent the direct rays of the sun incommoding visitors when viewing the fish tanks.

The private aquarium is 32 feet 6 inches by 30 feet (for view of this see opposite p. 72), and has three double rows of aquaria divided into thirty-eight tanks, for the storing of materials for workers, for experiments, hatching and the like; and along the east and south walls is a concrete table or bench for experiments, and for glass aquaria.

On the first floor is a lecture room, 23 feet by 18 feet 9 inches (for view of this see opposite p. 64), a Director's or Professor's room, 15 feet by 10 feet 6 inches, with private store and sink attached, and a dark room for photographic purposes, a special cubicle approached from the landing of staircase; a Laboratory, 32 feet 6 inches by 14 feet 7 inches (for view of this see opposite p. 70), provided with six cubicles, two of which at the south end have doors and can be locked up; a specimen room, 14 feet 7 inches by 13 feet 6 inches; a Library, 14 feet 7 inches by 13 feet 6 inches; and a store, 14 feet 7 inches by 4 feet 7 inches. All the cubicles are fitted up with pedestal drawers, tables, shelving and glazed fireclay sinks with hot and cold water and salt water laid on.

On the second floor (for plan of this floor see next page) is an entrance from a gangway leading from the sea banks; cloak rooms for ladies and gentlemen; lobbies opening on to the flat roof, lavatories and w.c.'s. On the south-west corner of the roof is a concrete tank to hold 2,000 gallons of salt water for the use of the Laboratory on first floor, and in a convenient position provision is made for a tank to automatically flush the drains at certain intervals. The cloak rooms on the second floor have been so planned as to present as little obstruction of the view from the sea banks as is consistent with the requirements of the Local Authority.

Against the west wall of the building is a concrete tank holding 15,000 gallons of salt water to give a constant flow of salt



J. J. LISH.
ARCHITECT.
Newcastle upon Tyne

— SECOND FLOOR PLAN. —

water through the various fish tanks, and the floor tank or "pool" on ground floor, and to supply the fountain. The supply to the various fish tanks is so designed as to secure a continuous and perfect aeration of the water at all times, and the ventilating details have been devised with due regard to the sanitation of the building.

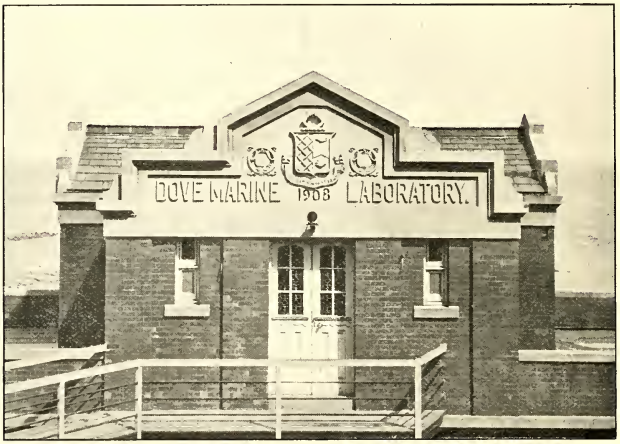
The outer doors to the building, the inner entrance doors and the glazed screens throughout have been filled in with leaded, "Prior," glass, manufactured by Messrs. Hayward Brothers & Eckstein (Limited) of London. This glass has peculiar brilliancy owing to its special method of manufacture in which one colour is flashed over another.

The public Aquarium rests on a slab of cement concrete heavily reinforced, and all storage tanks, fish tanks, and the entire foundations of the building, together with the quay wall, as before mentioned, have been carried out in reinforced concrete on the Hennebique system by Messrs. Purdie & Thompson, of Newcastle-upon-Tyne, who were the general contractors for the whole of the works. The foundations of the cast iron columns are in cement concrete carried down to the solid rock.

The building, with the above named exceptions, has been constructed in brick throughout, faced with pressed red brick and stone dressings, and the elevations, as will be seen in the several views, have been kept as simple as possible; the chief features being the ground floor entrance consisting of a recessed and moulded stone arch, resting on moulded stone pilasters, the space between being filled in with woodwork and glass giving an abundant light to the lobby, entrance hall, and office, whilst the north, east and south elevations on the first floor, are relieved with brick pilasters having a series of projecting brick bands, and a moulded stone cornice with parapet over; the second floor having stepped gables with boldly

moulded water-tabling, whilst a wide band of cement concrete finished with granite rough-cast runs round the building under the line of the first floor windows.

The west gable (over the second floor entrance) is faced throughout with stone, and in the centre is the joint coat of arms of the Hudleston and Dove families with the motto, "Soli deo



Second Floor Entrance with Gable over showing Coats of Arms, etc.

honor et gloria," and to the right and left of this are moulded and carved pateræ.

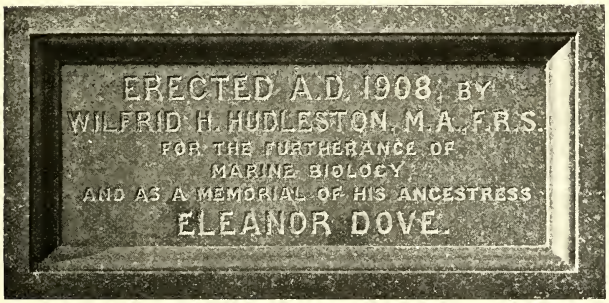
A moulded and polished red granite tablet is built into the wall on the ground floor near the main entrance, for view of which see opposite page.

Space is provided under the large storage tank for a powerful electric pump which draws water from the strum in the

harbour to supply the storage and fish tanks. The engineers for this installation were Messrs. Sleigh and Wood, of Newcastle.

At the south-west corner of the building is a boiler house with a boiler to furnish hot water to the lavatory basins and sinks throughout, and one to heat the water required for warming the building.

Salt water is supplied to the various fish tanks and to the workers' sinks throughout the building.



The sanitary drains from the second floor are carried under the wooden gangway in cast-iron pipes, and then through glazed fireclay pipes to the sewerage system of the village, and another and totally distinct set of drains at a lower level, below the surface of the quay, carry off the overflow water from the various fish tanks into the harbour.

In constructing the new quay wall it was decided to make the top of this wall about 2 feet higher than the level of the old quay, to allow of raising the general ground line round the new Laboratory so much higher, and the ground floor of the

new building has been kept 3 feet above the floor line of the old baths.

The heights of the rooms are as follows:—Ground Floor, from floor to ceiling, 15 feet; First Floor, 12 feet; and Second Floor, 9 feet. The elevation or floor level of the second floor (cloak rooms) was determined by the level of the village drainage system.

Armstrong College has provided the fittings and furniture for the several rooms to meet the special requirements of the various departments.

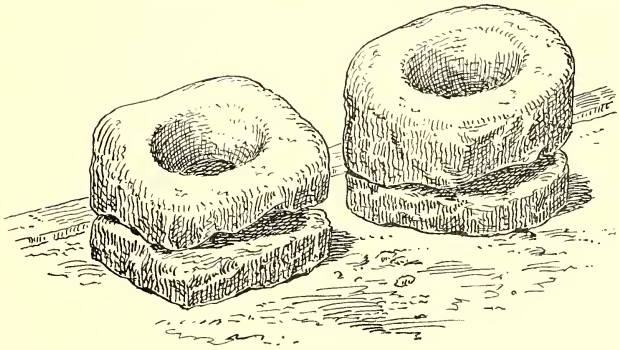
Mr. N. W. Reed, Newcastle, discharged the duties of Clerk of Works in a most efficient and satisfactory manner.

It may be here mentioned that as the slates on the old bath building were found to be in as good and sound a condition as when they were quarried, and of an exceptional size and character, it was decided to cover the roof of the second floor portion of the new building with these old slates; and, though they have already been in use for 100 years, they appear capable of enduring for an even longer period to come in their new position.

THE DOVE MARINE LABORATORY FROM THE SOUTH-EAST.

Two Old Mortars.

During the operations of taking down and rooting up the old quay wall, the remains of two old mortars were found on the site, embedded some little distance below the surface, near the north end of quay. Their discovery carries us back to the early days of the fishing industry at Cullercoats—to those robust and strenuous days, when the fishermen and their wives broke up



The Two Old Mortars.

and ground the hard bark or "cutch" in those very mortars—cutch being the commercial name for the *Acacia catechu*, a material containing, it is said, from 40 to 55 per cent. of tannin, which the fishermen use for all tanning purposes. "Boilers bubble with the brown *Catechu*, locally called 'cutch,' used as a preservative for the nets and sails," as we read in Bertram's *Harvest of the Sea*.

One mortar is round, whilst the other is square, with the corners rounded, and they are respectively 2 feet 6 inches

diameter and 2 feet 3 inches square, being made in two courses of stone each 9 inches thick. The cavity or grinding space in the mortar is in each case about 10 inches diameter at the bottom, 14 inches diameter at the top, and about 12 inches deep. One of these, as seen to the right hand in the accompanying view, is in a fairly complete state, whilst the other has not been so carefully dealt with. These mortars have by some been too hastily assumed to be of concrete, but that is manifestly an error, as they exhibit planes of bedding, which concrete never does, and, moreover, they are evidently of stone similar to much of that of which the pier bounding the north side of the harbour is constructed, and most likely have been obtained from the same source.

If at the present time we had to make such mortars we would possibly make them monolithic and construct them of good cement concrete, carefully reinforced or fibrated, as in the reinforced concrete work particularly described in the following pages, but the day of such mortars is past and gone, or as Dryden would have said—

'Tis done, and since 'tis done, 'tis past recall;

for the chemist has stepped in and now supplies the "cutch" in a readily soluble form, requiring no special preparation on the part of the modern fisherman.

The old mortars have been cleaned up and may be seen in position near the ground floor entrance to the new Laboratory.

Reinforced Concrete.

As "Reinforced Concrete," variously known as "Ferro-Concrete," "Armoured Concrete," "Fibrated Concrete," or "Steel Concrete," is so much in evidence in the Dove Marine Laboratory, and in its retaining or sea-wall, being in fact the very "bed-rock" on which the stability of the whole structure rests, it may not be out of place to say something as to the rise and development of this form of construction, and the part this country occupies in the matter. There need be the less hesitation in this owing to Armstrong College being so intimately associated with the working of the new Laboratory, and to the fact that one of the Governors of the College, the late Mr. W. B. Wilkinson, of Newcastle-upon-Tyne and Whitley, could claim to be, "the true and first inventor," of reinforced concrete in this country. Reinforced concrete, therefore, is here "on its native shore."

Mr. W. B. Wilkinson took out a patent in 1854 for a system of fireproof construction, by which, in floors of small span, having an arched soffit, "hoop iron on edge is laid across the crown, about 2 feet apart, or at a greater or less distance, according to the desired strength of the floor, and reaching its full length across the floor or floors: the under edge of the same is set on the crown or centering, or nearly so, so that in this low position it may act with the more power as a tension rod to the floor." Here, then, is an unmistakably clear and definite exposition of the root-principle of reinforced work, the metallic members being so disposed as to take the tension strains, whilst the concrete is relied upon to resist compression. For beams, and flat soffited floors, he used wire rope reinforcement as a catenary, the lower portion of the rope approaching the underside of the beam, or floor slab; the ends of the rope being well opened out, so as to bond in with the concrete, made all secure. It has been

said that there is no sign in this specification of any knowledge of what is known as "adhesion" between the concrete and the reinforcing material, but Mr. Wilkinson advised the use of old and therefore *rusted* wire rope, doubtless with the full knowledge that the concrete would act as a preservative of the iron, and that the rusted surface would give extra adhesion. In point of fact we now know that a chemical action takes place between the oxide of iron on the rusted reinforcement and the calcium of the cement, which not only preserves the iron or steel but brings about a closer union or extra adhesion between the iron and the concrete, providing that the oxide is firmly attached to the iron in the first instance. The convolutions of the rope would add still further to the holding surfaces, after the manner of the "deformed" bars now much in use. Mr. Wilkinson also says, "the centering should not be removed until the concrete has been sufficiently set, which will be at the expiration of about a month." A recommendation, it has been remarked, which though more than fifty years old, may still be regarded with respect.

There is no mention of piles in this specification, but Mr. Philip Brannon in his patent specification in 1871 gives a very clear drawing of a reinforced concrete pile, with a pointed metallic shoe for going into the ground, vertical rods and metallic binding members, "showing the arrangement for marine piling," apparently very much as in use at the present day, but he makes no mention in his specification as to the driving of the piles, though in another part of his specification he speaks of "suitable rammers or monkeys," and, of course, no pile could be used for marine work without being driven. However, from conversations the writer had with Mr. Brannon in the seventies he gathered that it was his intention to have some yielding material over the head of the piles during driving operations to act as a buffer between the driving weight or monkey and the pile, much like the method now practised.

Mr. Wilkinson, like many able inventors, was in advance of his time, but his patent of 1854, as is here seen, embodies in the clearest manner possible the dominant principles of reinforced construction, which modern developments have in no way departed from; later patents being chiefly for special applications of reinforcing, or for alleged improvements in matters of detail. To the engineers of the Continent, however, we are largely indebted for the important position armoured concrete now occupies. The French shot ahead of us in the practical application of the principles of reinforcement, just as the United States and Germany have outdistanced us in the production of Portland cement.

In reinforced work such names as Möller, Monier, Coignet, Cottancin and Considère, on the Continent are well known, but to M. François Hennebique, assisted by M. Mouchel and Partners, we must assign the leading position, not only on the Continent, but in this country, where they have been doing the "spade-work" of this admirable form of construction for some years past.

But, without wishing in any way to detract from the credit due to them, it is due to our own countrymen to point out, as is here done, that they had made public the leading principles of reinforced construction many years before M. Hennebique and M. Mouchel and Partners brought their great energy and undoubted abilities to bear upon the question here.*

* The above was written before the decision of the House of Lords as to an alleged infringement of his Patent 10,203 of 1897 brought by M. Hennebique against Messrs. Cowlin & Son for the use of ferro-concrete piles. The Court of Appeal held that the patent was invalid, having been anticipated by Brannon and others. M. Hennebique took the matter to the final Court of Appeal—the House of Lords—and the case was heard on February 23rd, 1909.

"The case in the House of Lords only occupied a day, and judgment was given in favour of the respondents—that is, Messrs. Cowlin & Son.

"The Lords of Appeal held that the judgment of the Court of Appeal was right—that the Hennebique patent had been anticipated, and was therefore invalid, that thus no infringement had taken place, and the appeal was dismissed with costs."

Then as to—

The Fire-resisting properties,
The Rust-resisting properties, and
The Strength, of Reinforced Concrete.

Portland cement has comparatively little tensile strength, but is capable of bearing great weight or pressure without crushing. Now if we *fibrate* or reinforce the concrete with steel, which has an enormous tensional strength, and so place the steel as to take the pull and shear whilst the concrete is so disposed as to resist the thrust or forces tending to compress the mass, taking care to properly bind the rods together (if rods are used) with straps, or "stirrups," which are a peculiarly French invention, we have a combination of materials in which each constituent is so placed as to bring into play its special characteristics in their most effective form, when called upon to resist any disruptive force, and this is what is done in all properly designed reinforced concrete work.

But, it will be said, "You are here bringing together and tieing up, 'for better or for worse,' totally dissimilar materials; how do you know that they will work together in harmony when put to the test?"

Well, it is found that steel and Portland cement concrete, under even violent variations of temperature, expand and contract in sensibly the same ratio—in fact, to five places of decimals.

Mr. Thaddeus Hyatt, of pavement-light fame, who had patents for fire-resisting concrete floors, made a comprehensive and valuable number of tests, in the seventies, to secure reliable data as to the behaviour of reinforced concrete under intense heats.

Bars of iron, after being embedded in cement concrete and exposed to the intense heat of a furnace for six hours, were

found in an entirely good and sound condition, showing no evidence of having "stressed" the concrete in any way.

In another test, a furnace was built and roofed in with a flat slab of cement concrete 7½ inches thick, having a series of bars of iron in the centre, with 3 inches of concrete above, and 3 inches of concrete below the bars. A fierce fire was kept up immediately under the covering slab for ten hours, and as an evidence of the intensity of the heat of the furnace, it was found that the faces of the fire bricks which formed the side walls, and were in contact with the fire, had been *melted;* the underside of the reinforced concrete roof slab being kept at a glowing red heat all over, and to make the test as much like what might be expected to occur in a real conflagration, a stream of cold water was thrown violently up against the underside of the glowing concrete slab by means of a force-pump, and on the furnace becoming entirely cold, it was found on examination, that the roof slab with its metallic reinforcement was uninjured and as sound and as good as at the start of this crucial ordeal.

And in great fires which have taken place of late, it was seen that the steel reinforcement, bedded but to a very moderate extent in the concrete, had brought no "stress," or disruptive force into play, but had come through the fire in a more satisfactory way than any other building material, thus emphasising the homogeneous character of the joint mass, the harmonious working of the combination, and its fire-resisting qualities at the same time.

But, again it will be said, "This reinforcing of concrete with iron or steel is essentially a new or comparatively modern device; what evidence have you, endorsed by the stamp of time, to show that the combination has any enduring qualities? You are here pressing into use a metallic body which is notoriously subject to oxidation. How do you know but that in a few years,

or it may be in a shorter period, rust will not have done its work and destroyed the compact you have so carefully prepared?"

As to that, it may be said that it is found that concrete has a *preservative* effect upon iron or steel embedded in it, and this has been shown to be so over long periods of time. "The city officials of Grenoble recently took up some reinforced concrete water pipe which had been in the ground for nearly twenty years and found there was not a crack in it, and that the reinforcing had not been subject to rust." In Paris a sewer of reinforced concrete, after forty years of use, was taken up and the metal found in a perfect state of preservation. And the hoop-iron bonds bedded in the mortar joints of some brickwork recently discovered in the city of London, dating from the time of the Roman occupation of this country, were found to be still perfectly bright and good. "Whilst investigations show that the immense chain which encircles the dome of St. Paul's Cathedral is as bright as ever, after being embedded in concrete for two centuries."

Further—"the durability of iron embedded in concrete is attested by iron clamps found in good condition in the mortar joints of the Pantheon after a period of near eighteen hundred years."

Then as to the behaviour of reinforced concrete in *sea-water* it is stated that on removing some natural cement concrete work in the harbour of Brest, which had been covered with sea-water for 100 years—iron bars found embedded in this concrete did not show the least indication of rust; the concrete having proved a perfect preservative of the iron.

And Mr. de Vesian says, "In making the new wharf at Southampton, nine years ago, some ferro-concrete piles were 5 or 6 feet too long. The extra material was cut off and the pieces left on the foreshore, where, owing to Southampton's

double tide, they were covered by the sea four times a day. Some of these pieces were recently taken up and examined. The protruding portions of the steel bars were, of course, entirely corroded away, but a quarter of an inch below the concrete surface, the metal was found to be as good and as bright as ever."

And again, the two-fold durability of the concrete itself and that of the embedded steel is verified by an exhaustive series of tests recently completed by Professor Norton, of Massachusetts, who holds that it is now a well established fact that steel properly embedded in well graded concrete is rendered absolutely rust-proof. Indeed, it seems clear that if we want to preserve iron or steel indefinitely, we cannot do better than bed it soundly and well in Portland cement concrete.

Dr. Rohland, Dr. Harrison, and others have traced the disappearance of rust from iron or steel bars, etc., used in reinforced concrete structures, to the chemical action of certain constituents always present in cement concrete, and in hydraulic mortars, which chemical action is practically an insurance policy guaranteeing the absolute preservation of the metallic constituents of the mass for all time.

Reinforced concrete, however, does not lend itself to rule-of-thumb methods, but must be carried out by skilled men in a careful and intelligent manner.

Then as to the *strength* of concrete, the following, which might be extended indefinitely, will show the relative strengths of concrete with and without reinforcement:—

Two reinforced lintels, each 9 inches in depth, $4\frac{1}{2}$ inches in thickness and with a clear span of $4\frac{1}{2}$ feet between the supports, were loaded with 20 tons of bricks, deflected $\frac{1}{8}$th of an inch in the centre but remained uninjured.

A slab of concrete 8 inches thick but without reinforcement broke under a weight of 9 cwts., whilst another slab exactly the

same size, but only 5 inches thick, and with reinforcement near its under surface required 237 cwts. to break it.

A reinforced beam tested by David Kirkaldy, of London, bore a weight of 2,500 lbs. before breaking, whilst an exactly similar beam, but without reinforcement broke off short, like a carrot, with but 431 lbs.

A slab of concrete 7 inches in thickness and with a clear span of 15 feet by 15 feet between the supports—about the size of an ordinary room floor—was reinforced with a single layer of expanded steel near its under surface, and tested to destruction in the presence of a representative committee, when a mass of pig-iron amounting to 15 tons 11 cwts. was required to be piled on to make it finally give way: the fractures radiating from the centre to the angles of the square.

Investigations have shown that the only buildings at Messina which withstood the earthquake shocks were those constructed of reinforced concrete.

It is found, moreover, that reinforced concrete has the singular property that its strength is much in excess of the strength of the reinforcing material and the concrete tested separately and added together.

Cement.

Having dealt with concrete, perhaps some slight reference should be made to the matrix or cementing medium which enters into its composition, whether reinforced or otherwise.

Joseph Aspdin, of Leeds, who is described as a bricklayer, in his patent of 1824, invented "Portland" cement, and gave it its distinctive name owing to its similarity in colour to Portland stone, and whether fortunate or not in the selection of this title for his new product, it has become known throughout the civilised world by that name.

"The name given to it by Aspdin has tended to some confusion of ideas about its source and origin, many supposing it was the product of converted oolitic limestone from the island of Portland in Dorsetshire."

A stalwart leader of thought, in a by no means remote part of Ireland, recently assured us, however, in confident and impassioned terms, as an adequate and decisive reason against its use in his district, that this cement, "of evil association, the product of convict labour," was being sent out from that well known establishment, "where Mr. Michael Davitt, of immortal memory, and other distinguished Irish patriots, were immured in prison pens for advocating the principles of Irish liberty"! which information will, possibly, be as new to the many manufacturers of this now famous cement, as to the Governor of His Majesty's guests in the Isle of Portland.

Aspdin established his first manufactory in Wakefield, his son afterwards moving to Northfleet, to start one of the earliest of those works which have made the Thames and the Medway famed throughout the world for the production of Portland cement. This cement is a combination of carbonate of lime

(chalk or limestone) and clay (or shale) so proportioned that, when calcined, the chief constituents will be within the following limits:—

Lime	from 60	to 66	per cent.
Silica	,, 20	,, 25	,,
Alumina	,, 5	,, 10	,,
Oxide of Iron	,, 2	,, 5	,,

Oxide of iron is not an essential constituent of Portland cement, however, for the white Portlands are practically free from iron, and are quite equal in strength and hydraulic qualities to the ordinary steel-gray variety, but are sold at about three times the price in America, where they are chiefly made.

The average analysis of a dozen representative and reliable brands of Portland cements I find to be as under:—

Lime	62·28
Silica	22·04
Alumina	6·74
Oxide of Iron	3·89
Magnesia	1·30
Sulphuric Acid	1·41
Insoluble alkalies, loss, etc.	2·12

The natural deposits of carbonate of lime and silicate of alumina usually employed are not the only materials available for the cement maker. There are, for instance, the wastes exuded in huge quantities from the blast furnaces, as yet hardly utilized at all, and which cost the iron masters large sums every year to get rid of.

Blast furnace slags contain silica, alumina, and lime, in widely varying proportions, with traces of iron oxide, together with some constituents of an undesirable nature, and as the

quantity of lime in slags is usually much below that in Portland cement, the need for adding an extra amount of lime to the mixture will be apparent if the object is to produce a cement of the Portland type.

That uncertain and treacherous fluid, as the molten slag has been called, has presented a tempting field, however, for the inventor, and many have tried to turn it into a satisfactory hydraulic cement.

A common practice has been to grind up dried slag sand with slacked lime (lime hydrate) and this is called "slag cement." This is a mere mechanical mixture, however, and not the true Portland which calls for all the ingredients *to be calcined together* to a hard clinker, and the clinker afterwards ground to a fine powder. Slag sand, as many persons are aware, is produced by running the molten slag from the furnace into cold water, which resolves the slag into a spongy and highly granular mass, much like very rough and friable sand—hence the name.

Frederick Ransome, of silica stone fame, made Portland cement in 1878 by grinding up slag sand with chalk or lime, and *reburning* the mass, getting rid of the objectionable sulphur compounds by a special process of his own, then grinding the resulting hard clinker in the usual way.

Amongst the latest projects for converting slag into cement, one may be mentioned which aims at mixing spongy and glassy slags, in specific quantities, to which a certain amount of ordinary Portland cement has been added as a stable source of lime.

Another inventor runs the molten slag into a weak solution of sulphate of magnesia (Epsom salts), which treatment, he says, agrees with its constitution, and, after drying and grinding, with an addition of the necessary lime hydrate, he claims to have obtained a good hydraulic cement. But neither of the two

last-named processes can claim to produce a Portland cement, as there has been no calcining together of the mixed materials.

Then there is the process propounded by Mr. Cowper Coles, the well-known electrician, who takes the molten slag as it issues from the blast furnace, with a temperature of possibly 3,000° F., and runs it into an electrical furnace where he adds a predetermined quantity of chalk, then raises the temperature still higher when the "undesirables," we understand, succumb to his heated arguments, and leave him with a clear and reliable working majority of silica, alumina, and lime, which are equal, he considers, to any calls which may be made upon them as an hydraulic cement.

Calculating, approximately, the yield of slags from the blast furnace output of iron (for the figures for which I am indebted to Prof. H. Louis), we may consider that not less than fifty million tons of slag are produced every year, which, by selecting the more suitable qualities, and adding the necessary amount of lime, would yield more than the present total of the world's entire output of Portland cement.

When Mr. Cowper Coles, or others, can really produce a sound, strong, and uniformly reliable cement, equal to the best Portland, from blast furnace slag, and that in any required quantity, as economically as some profess to be able to do, the present cement makers may see a danger of their works being relegated to the scrap heap, but such a prospect is possibly not giving them serious concern.

In the early days the production of Aspdin's Portland at the various works was such as not to bring out its full capabilities, but the process has been so improved that manufacturers are now producing Portland cement quite four or five times the strength it was usually made about the middle of last century. Great Britain, which was the inventor and pioneer of this cement,

is now out-distanced both by Germany and by the United States in the quantity produced—the latter country being by far the largest producer of Portland. The world's production of Portland cement ranges from nineteen to twenty millions of tons per annum, and it is the finest all-round cement we know of. In addition to being extensively employed in structural works of all kinds it is now being used in reinforced concrete for small ships and lighters, and it is proposed to be used as armour backing for warships. Up to a recent period the cement making materials were calcined in kilns much like lime kilns, or brick kilns, but between twenty and thirty years ago, what is known as the "rotary" kiln was invented in this country—that is, a long tube, resting on rollers and laid with a slight fall from the feed to the delivery end, slowly revolved, and heated internally, whilst the materials to be calcined were passed in at one end and out at the other end of this revolving kiln, after which they were ground, and thus made into *cement*, for "cement clinker," until *ground*, is little more like cement than are flint pebbles or other aggregate.

At the time when the rotary process was introduced, the proposal to make a sound and reliable Portland cement by trundling the cement-making materials, in the condition of a perfectly dry and loose powder (or as a wet "slip" or "slurry") through a revolving retort, would appear to the majority of practical cement makers as one of those "chimerical fancies fit for a shorn head," but Frederick Ransome, who is recognised in both hemispheres as the inventor of the first practical and workable rotary kiln for the manufacture of cement, demonstrated its entire practicability, though he might not, at the time, fully realise that he was introducing an epoch-making invention, and one which would prove to be revolutionary in more senses than one.

It is stated that quite 75 per cent. of all the Portland cement

produced in the United States is now made by means of the rotary process, the kilns for which are in some cases 150 feet long and 7 feet 6 inches internal diameter, and the Americans have so improved this form of kiln, that the largest producers of this cement in this country have acquired the rights to use this improved American form of the rotary kiln.

The United States of America—where Portland cement making did not get a start until the early seventies—in the year 1882 had only the trifling production of 85,000 barrels, but, as shown by its "growth curves," had increased its production by unprecedented leaps and bounds, until in 1900, it was sending out 8,482,000 barrels, and in 1906 was producing the enormous total of 46,463,000 barrels without a single set back, and in 1908—upwards of 51,000,000 barrels, now easily heading the world's production of Portland cement, manufacturing as much as Great Britain, France, and Germany combined. Germany, which is ahead of us in quantity, is by no means behind us in the quality of the cement produced. Canada, Russia, Belgium, Denmark, Sweden, Austria, Italy and Switzerland are making their presence felt, whilst the men of the Islands of the Far East have now entered the field as cement producers: and we, who have hitherto had something to say in such matters, who invented "Roman" and "Portland" cements, who headed the world's production of these, who exported the converted chalks and clays of the Thames valley, and of the Tyne, to every quarter of the globe, who gave to the world the greatest invention (the rotary process) ever introduced into this industry, are now paying a more forceful and enterprising people for the right to use an improved form of this very rotary process, and are relegated, moreover, to the position of a third-rate power in cement production.

THE DOVE MARINE LABORATORY FROM THE SOUTH-WEST,

Showing the approach from the Cliffs to the Second Floor, the Salt-water Tanks, etc. In the background is seen the Hudleston Hotel, Dial House, the Fishermen's Look-out House, and below this, the new Lifeboat House. On the headland to the extreme right is a view of the Cullercoats Wireless Telegraph Station, with its mast 220 feet high.

Opening of the Laboratory.

The following report of the opening ceremony appeared in the local Press:—

NEW MARINE LABORATORY.

Opened at Cullercoats Yesterday Afternoon.
(*29th September*, 1908.)

Mr. Hudleston's Generosity.

The Dove Marine Laboratory, at Cullercoats, was opened yesterday afternoon by the Duke of Northumberland. A description of the laboratory, which is to be occupied as a department of Armstrong College, Newcastle, appeared yesterday. In consequence of the summer-like weather the ceremony took place in the open air, and attracted an audience of several hundreds, whilst the banks overlooking the new building were quite thronged for the double purpose of witnessing the passing of the Channel Fleet, an event that took place simultaneously. The Duke, with whom were the Duchess of Northumberland and Lady Muriel Percy, was accompanied to a platform in front of the laboratory by Mr. W. H. Hudleston, who presided, and Mrs. Hudleston, the Lady Mayoress of Newcastle (Mrs. Sanderson), the Sheriff of Newcastle (Councillor Walter Lee) and Mrs. Lee, Professor and Mrs. Meek, Mr. W. E. Archer (Under Secretary of the Board of Agriculture and Fisheries), Mr. A. Ireland Wright, Mr. J. J. Lish (architect of the building), Mr. G. E. Henderson, and others. There were also present County Alderman Hogg, County Alderman Grey, County Alderman T. Darling, County Alderman Cromie, Colonel MacKenzie (Chairman of the Wear Fishery Board), the Under Sheriff of Newcastle (Mr. Horace Criddle) and Mrs. Criddle, Mr. George Wilkinson, Alderman Dodds, County Councillor Craggs, Councillor W. Hutchinson, Councillor Plummer, Councillor G. H. Hogg, Councillor Elwis, Councillor Ben Hewitt, Mr. D. E. Stanford, Mr. W. S. Burton, Mr. Gerald Stoney and Mrs. Stoney, Mr. W. H. Ryott, Mr. A. F. Ericsson, Mr. Harry Benson, Mrs. John Dent, and the Misses Dent, Councillor R. Mason, Councillor J. C. Clemitson, Councillor R. White, Dr. R. Bolam, Councillor J. G. Cole, Professor and Mrs. Stroud, Professor Mark Wright, Alderman George Harkus, Mr. E. L. Gill, Mr. R. S. Holmes, Mr. N. H. Martin, Mr. F. H. Pruen (Secretary of Armstrong College), Mr. D. Purdie and Mr. W. Thompson (contractors of the building), Mr. N. Temperley, Professor Garstang, Professor Thornton, etc. Apologies for absence were announced from the Dean of Durham (President of Armstrong College), Earl

Carrington (President of the Board of Agriculture), Lord Barnard, Sir Isambard Owen (Principal of Armstrong College), and others.

Mr. W. H. Hudleston, M.A., F.R.S., to whose great generosity the existence of the laboratory is due, presided over the preliminary part of the proceedings, which took place upon the rocky platform in front of the new structure.

The Chairman, in his opening remarks, gave a brief history of previous uses which the site of the laboratory had been put to. Originally it was occupied by saltpans, that industry being established by a Newcastle merchant. The industry removed, and Cullercoats becoming a fashionable watering place, a bath house was built where the saltpans had been.

The amusing part of that building's history, Mr. Hudleston added, was that it was put up without the knowledge of the owner of the site. It was constructed in 1807, so that when it was demolished last year it had been in existence exactly 100 years. Now the site was occupied by a marine laboratory, which he believed would be of great benefit to the public and to science.

He expressed the gratification of not only himself, but all present, at the fact that the Duke of Northumberland had consented to be present, and he asked him to kindly open the laboratory.

Speech by the Duke of Northumberland.

The Duke of Northumberland, in declaring the building open, said that Cullercoats had long been a favourite spot for the naturalists to study and make marine investigations, but it was not till 1897 that an establishment was started there for the purpose. It was commenced under the auspices of one whose loss they all deplored, the late Mr. John Dent. His Grace did not know whether many of them knew how good a friend and how useful a citizen to Northumberland Mr. John Dent was. He had come in contact with the deceased in many different capacities, as a shipowner, and as a member of the County Council, and he was a true and reliable friend, and one who did yeoman service for the people of Northumberland. He did not think, however, that the late Mr. Dent worked harder for any section of the population than he did for the fishermen. They all knew how he put his vessel at the disposal of those who were inquiring into those matters which affected the interests of the fishermen. They knew how long he presided over the Fisheries Committee, and how that he spared neither money nor exertions in the prosecution of his objects. The laboratory which he started at Cullercoats came to an untimely end, for it was burned down, and he (the Duke) well remembered that Professor Meek was just on the point of trying to raise money to extend its usefulness when it disappeared alto-

gether. That must have been a very great trial to anyone as zealous as Professor Meek in this matter. They were all alive to the great importance of this marine laboratory. A great deal had been done lately in the way of founding them. There was one at Plymouth, one at Port Erin in the Isle of Man, one in Lancashire, three in Scotland, and now they had added the one he had the pleasure to open that afternoon. There was likewise a laboratory and a further floating one in Ireland. He thought they would see that if they were to study the habits of fish and shellfish, and upon both these classes the welfare of the fishermen largely depended, they could only efficiently do it by having these laboratories scattered about the country. If the results were as satisfactory as they wished them to be they ought to have laboratories on every coast. It had been discovered that some of these denizens of the ocean were a good deal more peripatetic than they were supposed to be, and Professor Meek would tell them that a crab, who did not seem to be a very good goer to look at him, made very long journeys if they gave him the time. Therefore, one laboratory must check the results of the other all round the coast if the work was to be properly carried out.

Importance of the Laboratory.

Now they saw why it was important to have a laboratory there, because it filled up the gap on the east coast they were desirous to fill up. He was afraid they might have been slow in getting one if it had not been for the wisdom and generosity of Mr. Hudleston, who came forward and gave them the site and the money with which to build it. It was a very noble action on his part. Mr. Hudleston desired, like a true Englishman, that someone else's name should be associated with the building, and had commemorated an ancestress, Eleanor Dove, with the edifice. He did not think that desire would prevent them from recollecting the name of Hudleston whenever the building was referred to. They owed a great debt of gratitude to Professor Meek, who was to have charge of the work there, and they were conscious of his work in marine investigation in the past, and knew how well he was qualified for the work of the laboratory. The furnishing of the building was not yet complete. The County Council of Northumberland had contributed, and were willing to contribute, £100 per annum to the institution. It was willing to do more, and would double that amount if the borough of Tynemouth would come forward and subscribe £50 at least. It was not for him to say what the borough of Tynemouth ought to do. He did not know the secrets of the "prison house," but he hoped they might be able to afford even more than £50 for such a valuable institution, and if they did that they might rely on the County Council doing their part also.

Votes of Thanks.

Before his Grace actually performed the opening ceremony, a vote of thanks for having attended to carry out the duty was heartily accorded him upon the motion of Mr. W. E. Archer, seconded by Professor Garstang.

Professor Meek moved, and the Sheriff of Newcastle seconded, a vote of thanks to the Chairman, both gentlemen gratefully acknowledging Mr. Hudleston's generosity.

The Chairman having replied, the company proceeded to the main entrance of the laboratory, where Mr. Purdie (the contractor) presented his Grace with a gold key as a souvenir of the occasion. His Grace opened the door, and a large company of ladies and gentlemen was conducted through the building.

A Well or Pit Shaft.

On taking up the floor of the old baths, when clearing away that building for the new Marine Laboratory, a circular shaft or well was disclosed, lined out in a substantial manner with a good thickness of stone, and this we filled up solid with cement concrete, making all secure. This discovery at the time was regarded as *a well* for supplying the water required by the vessels trading with the port of Cullercoats. Since then, however, mining opinion has somewhat favoured the view that this may possibly have been the shaft of an old *coal pit*, the shaft being arched over some few feet down from the surface, as was the usual practice in such cases when mining operations had come to an end.

As the coal measures dip to the west or south-west, and therefore rise towards the coast, a shaft down on the foreshore would be nearer the upper seams, which, of course, would mean less sinking, and greater economy in working.

Mr. Bell's plan (see facing p. 114) shows pits in Arnold's, *alias* Marden, Close, which is a part of the Hudleston property, and but a short distance from the old baths.

Mr. Craster, in his *History of Tynemouth Parish*, p. 280, speaking of the north-east corner of the township which now forms the village of Cullercoats, says—"Coal was worked here in 1315, when the workings were destroyed in a Scottish invasion." Can the shaft discovered on the site of the baths have been the shaft of one of the pits above referred to?

Mr. Hudleston in a footnote (p. 9) says Mr. Craster refers to Marden and not to Cullercoats, but in the 14th century the name Marden was probably not applied to its present locality, as we know it, that is about the limestone quarries (see plan). The "Miller of Marden," moreover, had his mill, it is presumed, somewhere near the mouth of Marden burn, possibly in Marden Close, or what is now old Cullercoats, so that if Mr. Craster referred to Marden he would probably refer to a locality much nearer the coast than the limestone quarries, in other words, to what is now the township of Cullercoats and the extreme north-east of Tynemouth parish.

Obituary.

Since the text of "The History of the Dove Family and their descendants in connection with Cullercoats," together with an account of the Dove Marine Laboratory, Cullercoats, and its scientific history and objects was written and ready for the press, Mr. Hudleston's most unexpected death has occurred; that event taking place on the night of Friday, 29th January (1909), from an attack of syncope whilst crossing the hall at his country house, West Holme, Wareham, Dorset. Deep sympathy has been expressed with Mrs. Hudleston, who was in the house at the time, and especially in the distressing suddenness with which the sad event happened. The remains were interred at Ham, in Surrey, on Friday, 5th February, amidst many tokens of sorrow and appreciation. In addition to the family and personal friends, the various learned societies of which the deceased had been such a distinguished member, were represented at the funeral, where the burial service was read by the Rev. P. A. Butler, Rector of East Stoke—the parish in which West Holme is situated, and of which Mr. Hudleston was Lord of the Manor.

Mr. Hudleston was in his eighty-first year, and up to the day of his sudden seizure he had apparently been enjoying fairly good health, indeed his vigour and activity were remarkable, and during the summer of 1908 he walked from Tynemouth Haven to Cullercoats with the writer, explaining and enlarging upon the geological formation of the coast line in the luminous and captivating manner which he invariably exhibited in speaking upon his favourite topic; scrambling over the boulders and steep face of the cliffs as nimbly as a young man, and with the sureness of foot of the practised geologist.

He had a keen faculty for the lucid exposition of scientific fact, a fine gift of literary expression, and great personal geniality, combined with most methodical and businesslike habits, and as a correspondent, speaking from my experience of over forty years—his final communication being received on the day of his fatal seizure—his letters up to the last were, as usual, in his firm, clear, and legible style, singularly free from a display of those mysterious hieroglyphics in which some less eminent exhibit their individuality; a combination of qualities, I venture to think, all too seldom met with amongst distinguished men.

Wilfrid Hudleston Hudleston (formerly Simpson), J.P., M.A., F.R.S., F.G.S., etc., was one of the eminent geologists and ornithologists of the last century; it was not, however, as a geologist, but as an ornithologist, that he first made a distinguished name for himself. Accompanied by Professor Alfred Newton of Cambridge, and Mr. John Wooley, he visited Scandinavia and went to Lapland in pursuit of ornithology, spending the summer of 1855 in that country. They sailed from the Tyne in a trading vessel, with a heavy, but fortunately, securely lashed, deck cargo of engines; this was before Plimsoll interested himself in the "load-line," and Mr. Hudleston was in the habit of relating that they were overtaken by a violent storm and watched "those lashings" with nervous interest. Had they given way, we should have heard no more of three famous scientists. Subsequently, Mr. Hudleston explored the eastern atlas in company with Canon Tristram and Mr. Osbert Salvin, and afterwards over twelve months were occupied by him in making ornithological collections in Greece, Turkey and Algeria.

A considerable portion of the twelve years, 1850-1862, was spent in foreign travel in various parts of Europe and Northern

Africa. During this time he gave his attention to the physical and geological features of the various countries visited, whilst ornithology continued to occupy a foremost place in his investigations; accounts of his journeys and explorations being contributed to various scientific publications.

While at Cambridge University he evinced a taste for geology, and attended the lectures delivered by Professor Sedgwick, but it was not until 1867, when he came under the magnetic influence of that eminent geologist, Professor John Morris, that he became a confirmed and enthusiastic "knight of the hammer" for the remainder of his days.

Among Mr. Hudleston's many and varied distinctions, he was a Fellow of the Royal Society, the Linnean Society, the Geological Society and the Chemical Society.

The *Geological Magazine*, *Heywood's Biographies*, and other publications bear appreciative testimony to his eminent scientific attainments, and to these the present writer is indebted for some biographical details.

He was the eldest son of Dr. John Simpson of Knaresborough, who married Elizabeth Ward, heiress of the Hudlestons of Cumberland, and who by letters patent assumed the name of Hudleston in 1867. Born at York on 2nd June, 1828, he was the descendant of three generations of Yorkshire medical men. From 1831 to 1834 his parents resided at Harrogate, where he remembered meeting his first playfellow, Henry Clifton Sorby—afterwards a distinguished geologist, and LL.D., F.R.S., and President (1878-1880) of the Geological Society of London—then a schoolboy in the neighbourhood. Mr. Hudleston received his early education locally, attending St. Peter's School, York, for about five years, from which he was transferred to Uppingham School, and subsequently entered St. John's College, Cambridge, where he graduated as B.A. in 1850, and M.A. in 1853.

On leaving Cambridge he devoted some time to the study of the Law, and was called to the Bar in 1853, but being possessed of ample means he never practised. In 1858 he helped to found the British Ornithological Society. From 1862 to 1867, his long period of distant travel being mostly over, he began a special series of scientific studies, selecting particularly natural history and chemistry. During this time he studied at Edinburgh under Playfair and Stephenson Macadam, and subsequently for three sessions at the Royal College of Chemistry in London under Hoffman, Frankland, and Valentine. At that time he was undecided whether to take chemistry or geology as his principal subject, when, as above stated, his meeting with Professor Morris determined his studies in favour of geology, which was to occupy the greater portion of his scientific attention for the rest of his life. To this science he applied himself with characteristic zest and thoroughness. He became one of the more eminent geologists, and imparted his extensive knowledge freely, both by voice and by pen.

It may be noticed in many of his earlier papers that they have a decided bias towards chemical geology, in which subject he always took a deep interest. His papers on, "The Yorkshire Oolites" (1873-1878) and "The Corallian Rocks of England" (written in connection with Professor J. F. Blake, 1877) soon established his reputation as a leading geologist.

In 1884 Mr. Hudleston was elected a Fellow of the Royal Society in acknowledgment of his scientific attainments.

Mr. Hudleston resided for many years in Cheyne Walk, Chelsea, associated now for all time with the memory of Thomas Carlyle; but in 1883 he removed to Oatlands Park, Surrey. This rustication, however, interfered with his scientific engagements, and he again took up his residence in town, at 8, Stanhope Gardens, South Kensington, which continued to be his town house to the end of his life.

In 1867 (a fortnight only before he changed his name from Simpson to Hudleston) the deceased was elected a Fellow of the Geological Society of London. Four years later he became a member of the Geologists' Association, served the office of secretary for three years, from 1874 to 1877, during which time, besides the duties of his office, he organised excursions, prepared the reports, and recorded carefully the scientific work accomplished. In 1881, in recognition of his scientific worth and splendid services to the Association, he was elected president.

On the death of his old friend, Professor Morris, in 1886, Mr. Hudleston succeeded him as one of the editors of the *Geological Magazine*, to which, since 1879, he had been a frequent contributor, and in 1886 he became one of the secretaries of the Geological Society of London, an office which he continued to hold until 1890. Following Sir Archibald Geikie, D.Sc., LL.D., F.R.S., Mr Hudleston was in 1892 elected to fill the office of president, and during the two years in which he occupied the chair he delivered two important addresses, dealing with the recent work of the Geological Society, which he passed critically in review, taking in 1893 the papers on "Tertiary and Secondary Formations" and in 1894 those on the "Palæozoic and Fundamental Rocks."

From 1872 to 1904 Mr. Hudleston's Memoirs and Contributions to geological questions amounted to fifty-eight, and in addition to these, he was the author of a considerable number of addresses, reviews, and notices, and his energy and ability is attested by the literary achievements he has left to the country in his writings on geological subjects.

In 1897, Mr. Hudleston was awarded the highest honour which the Council of the Geological Society could bestow—the "Wollaston Gold Medal," in recognition of his valuable contributions to our knowledge, treating of chemical, mineralogical,

palæontological and stratigraphical geology. In awarding this, particular reference was made to his monograph on the "Inferior Oolite Gasteropoda," which contains no less than 514 quarto pages of letterpress, and 44 plates illustrative of fossils. The Gasteropoda alone numbered many thousand specimens, carefully labelled and arranged, the "types" being all specially marked. It is not too much to say that this was in all respects a model of what a monograph should be. No previous author had taken such pains to verify in the field the horizons from which the fossils had been obtained, nor studied more fully the Continental types figured from equivalent strata.

Only a few weeks before his death Mr. Hudleston went to London, and was presented with a special gold medal by the British Ornithological Society, in recognition of his services to geology and to the Society, of which he was one of the three founders, in 1858; the other two being Mr. John Wooley and Dr. Alfred Newton.

Mr. Hudleston had been invited to preside over, or take part in, the councils and committees of numerous scientific societies. He was elected president of the Devonshire Association for the Advancement of Science, Literature and Art; of the Yorkshire Naturalists' Union, and of the Malton Field Naturalists' Society, and when Lord Eustace Cecil resigned, he was offered the presidency of the Dorset Natural History and Antiquarian Field Club. Mr. Hudleston had been a member of the Council of the Royal Geographical Society, and was president of the Geological Section of the British Association at Bristol in 1898.

He married Miss Rose Benson, second daughter of the late William Heywood Benson, Esq., of Littlethorpe, near Ripon, who survives him.

Early in January, 1895, Mr. Hudleston, accompanied by

Mrs. Hudleston, left London for Bombay, where they arrived near the end of the month and continued their journey towards the north-west frontier of India. The geological results of this expedition were embodied in the second part of his paper, "Notes on Indian Geology," read before the Geologists' Association during the presidency of the late General C. A. McMahon, December, 1895, who himself contributed an appendix on some of the rock-specimens collected. After visiting Simla, Mr. and Mrs. Hudleston proceeded across the Punjab to the banks of the Jhelam. Here they had an opportunity of ascending Mount Tilla, the eastern extremity of the Salt Range, and thence transferred their base of operations to Rawal Pindi, whence Jamrood, Abbottabad, Murree, and finally Srinagar itself, were visited.

It may be of interest to note that the last paper Mr. Hudleston wrote was on the Geology of India, and was sent for publication but a few days before his lamented death.

A magistrate and a landed proprietor in Dorsetshire and the West Riding of Yorkshire, Mr. Hudleston was a keen sportsman, loving both fishing and shooting. He has been heard to recall the time when it was practicable for a good shot to bag over dogs between 600 and 700 brace of grouse in a single season on a Scotch moor, and many will miss those contributions from the proceeds of his rod and gun given with such regularity and liberality.

His estate of West Holme, which he acquired from the late Admiral Sir R. O'Brian Fitzroy in 1897, was well stocked with ground and feathered game and water fowl, and he had arranged to hold his last shoot of the season on the coming Monday, a date, however, that was anticipated by his decease three days before it.

At the time of his death he was engaged in re-arranging all the Dorset fossils in the Dorset County Museum, of which

institution he was a vice-president, and with characteristic public spirit he had, from his own collection of Corallian fossils, which he had been making for thirty years, presented choice specimens to the Museum to fill up gaps in the series.

He left £1,000 to the Geological Society, and his collection of Inferior Oolite Gasteropoda to the Sedgwick Museum at Cambridge.

Mr. Hudleston was a member of the Athenæum, and of the Oxford and Cambridge Clubs, and for nine years held a commission in the Kent Artillery (Militia), retiring therefrom in 1867.

In politics he was a staunch Conservative, and vice-president of the East Stoke Conservative Club. He attended the annual dinners whenever his health admitted of his doing so, and invariably contributed to the after-dinner speeches.

Ever active up to the last, he had planned (in pencil) the speech he intended to deliver at the special general meeting of the Geological Society on 10th February, and on 20th January, nine days before he passed away, he posted to his friend, the editor of the *Geological Magazine*, a very able review of *Records of the Geological Survey of India*.

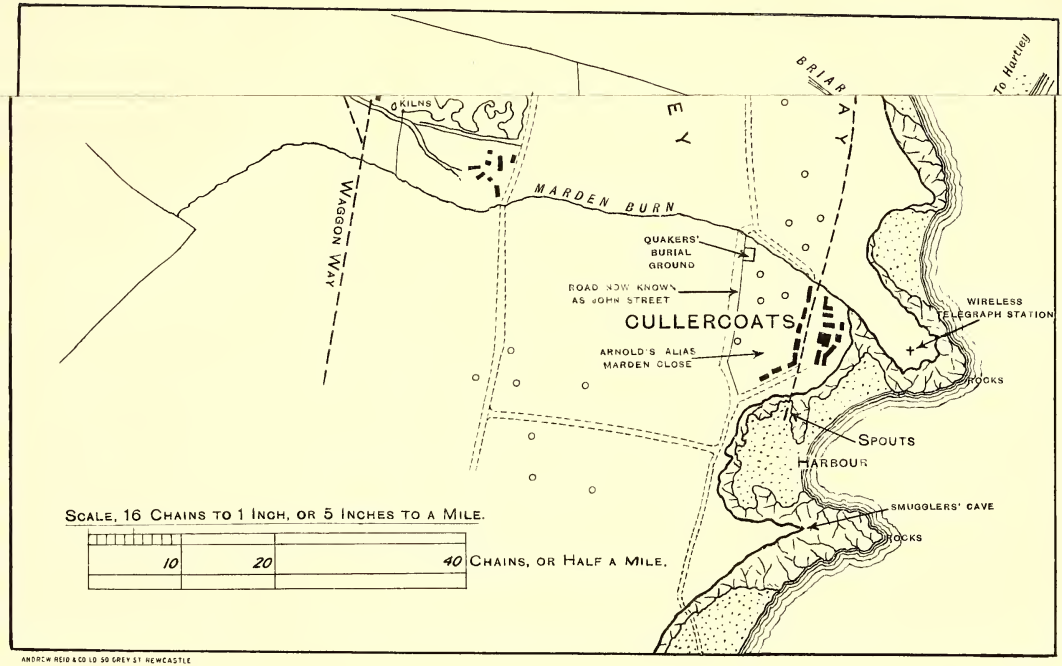
J. J. L.

Appendix.

The plan on the opposite page is reproduced from a plan by Mr. Thomas Bell, made during the first half of the 19th century, based upon Isaac Thompson's plan of the Whitley and Cullercoats districts, of an earlier date, by which it will be seen that Mr. Maberly Phillips had been misled (see p. 18) as to the direction taken by the waggon-way from the Whitley and Monkseaton collieries, which, instead of proceeding by way of Marden and then east along the south side of Marden Burn, ran *direct* from the above collieries to Cullercoats Haven. After crossing Marden Burn, nearly at right angles, it entered the main street of Cullercoats, going along the west side of this street until it reached the bank top near where the fishermen's look-out house now stands as stated by Mr. Maberly Phillips.

I have pointed out the positions of the Smugglers' Cave and the Quakers' burial ground where shown on Mr. Bell's plan, and have indicated where those modern structures, the Whitley Convalescent Home, and the Cullercoats Wireless Telegraph Station are situated.

To Mr. W. W. Tomlinson I am indebted for an intimation of the existence of this plan, and to Mr. T. E. Forster, mining engineer, Newcastle-upon-Tyne, for a copy of the plan for reproduction in this volume. J. J. L.



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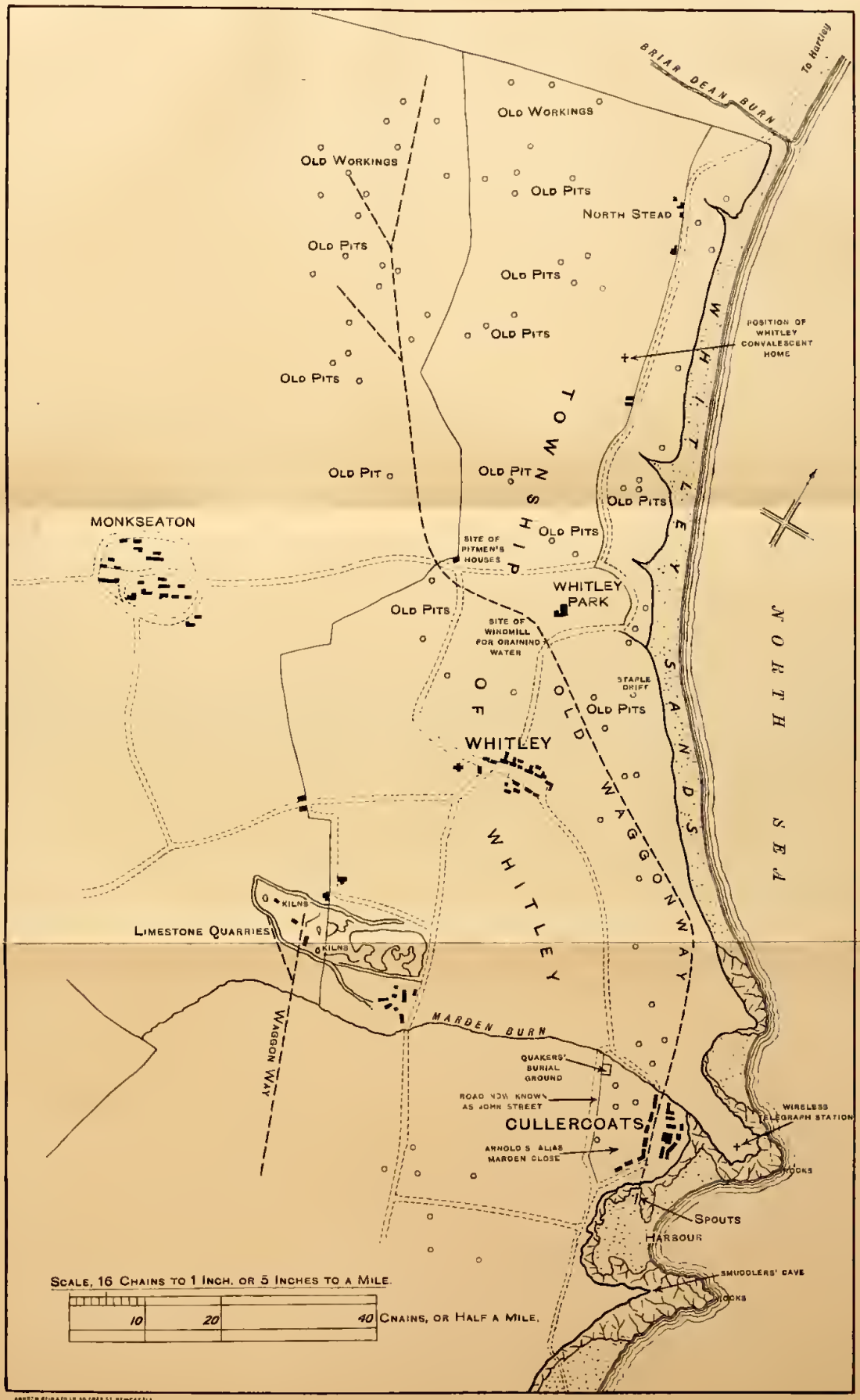
BRIAR DEAN BURN
To Hartley
OLD WORKINGS
OLD WORKINGS
OLD PITS
NORTH STEAD
OLD PITS
OLD PITS
OLD PITS
OLD PITS
POSITION OF WHITLEY CONVALESCENT HOME
TOWNSHIP OF WHITLEY
WHITLEY SANDS
NORTH SEA
OLD PIT
OLD PIT
OLD PITS
OLD PITS
MONKSEATON
SITE OF PITMEN'S HOUSES
WHITLEY PARK
OLD PITS
SITE OF WINDMILL FOR DRAINING WATER
STAPLE DRIFT
OLD PITS
OLD WAGGONWAY
WHITLEY
KILNS
KILNS
LIMESTONE QUARRIES
WAGGON WAY
MARDEN BURN
QUAKERS' BURIAL GROUND
ROAD NOW KNOWN AS JOHN STREET
CULLERCOATS
ARNOLD'S ALIAS MARDEN CLOSE
WIRELESS TELEGRAPH STATION
ROCKS
SPOUTS
HARBOUR
SMUGGLERS' CAVE
ROCKS
SCALE, 16 CHAINS TO 1 INCH, OR 5 INCHES TO A MILE.
10
20
40 CHAINS, OR HALF A MILE.

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