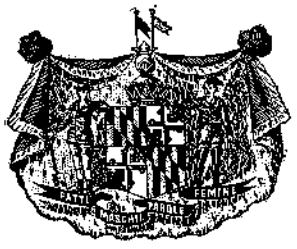
MARYLAND

GEOLOGICAL SURVEY



VOLUME TWO

BALTIMORE
THE JOHNS HOPKINS PRESS
1898

The Friedenwald Company
BALTIMORE, MD., U. S. A.

CONTENTS

ILLUSTRATIONS

THE MAPS AND MAP-MAKERS OF MARYLAND.

BY

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INTRODUCTION.

Since the days of Rameses II (B. C. 1300), men have attempted with their rude drawings on wood and papyrus showing the location of roads and the courses of streams filled with crocodiles and fishes, to keep their bearings and record their discoveries by means of maps; and the subsequent study of these drawings has aided in the elucidation of controverted questions in geography, ethnology, and history. Although few maps of detailed accuracy were made prior to the discovery of the American continent, it is of interest to consider briefly the development of cartographic representation down to that time.

The earliest attempts at map-making consist in the tracings in sand and in the rude modeling of the savages, while the first permanent records seem to be in the form of road maps with occasional indications regarding the location of streams and lakes. Before such sketches could be carried over large areas without grotesque distortions, it became necessary to determine by astronomical observations the latitude and longitude of certain points for control. Such observations were early made by the Greeks and represented by Anaximander (B. C. 560) in his map of the world. Subsequently Ptolemy collected a great number of these determinations and made calculations, which unfortunately involved several fundamental errors. Ptolemy's work, translated into Latin in 1409, aroused great interest in cartographic subjects on its appearance in 1475, and served as a basis for many of the maps of the world published during the close

of the fifteenth, and the beginning of the sixteenth centuries.[1] These Ptolemaic maps all involve the errors of Ptolemy, and may usually be recognized by them. For example, the Mediterranean is too long and Europe is too narrow, while Asia extends much too far east, and southern Africa is broader than it should be. These mistakes, which were current in the most authentic maps of the time, had a marked influence in establishing Columbus' faith in the possibility of reaching Asia by a westward course.

In spite, however, of the strong influence exerted by Ptolemy in the location of points and in the delineation of shore lines, the early maps seldom possessed parallels of latitude or meridians of longitude, since down to this time no satisfactory method had been devised for the rapid determination of longitude at sea. Latitude was determined with tolerable accuracy; but mariners who used the charts seemed to care little for these determinations, preferring to get their locations by compass direction from certain fixed points, as shown in Fig. 27. For this reason the old maps are covered with a network of lines running in all directions from the central points, called "wind roses" ("rose de vent"). This lack of means for determining the longitude influenced the character of all the larger maps, which frequently show distortion east and west, until 1736, when John Harrison perfected his chronometer. The erroneous views held by the Farrers (Plate XLV) would not have gained credence if it had been possible for Drake and Smith to determine the longitude of the lands which they explored.

The cartographic achievements of the fifteenth, sixteenth and seventeenth centuries were so great that it may seem strange to find so few references to them in the succeeding pages. Such references, however, would be out of place since all of the maps in the great atlases of Mercator, Bleau, Ortelius, and their contemporaries base their delineation of the Chesapeake and its shores on the scanty information furnished by Ayllon and Gomez or on the much more detailed work of Smith. When these sources have been discussed there is little left to mention beyond an occasional advance in the use of names or in the art of engraving. With increased skill in the preparation of

[1] Winsor, Bull. Harvard Lib., No. 19.

the large "Mappe Monde," or maps of the world, the publishers added illustrations and illuminations of brilliant colors, gold, silver, wild animals, plants, and fanciful designs, which gave additional information concerning the country represented. From these figures much may be learned regarding the contemporaneous impressions given by the tales of wanderers returned from their voyages.

In the succeeding pages, the attempt is made to present the information concerning the few maps which represent an increase in knowledge, based on observation of the territory depicted, in such a way that it may be of interest to the engineer, the student of local history and the intelligent citizen of the state.

Among the facts which it is desirable to know concerning any map are those pertaining to the men who made the sketches and surveys, to the time devoted and to the circumstances which led to the preparation of them. The latter are especially necessary, since from them is determined the personal bias of the author, which often finds expression in the delineation of boundaries, swamps, mountains, and streams. Upon these factors is based the estimated accuracy and reliability of the work. Moreover, a comparison of the finished product with the most authentic maps of the present day often indicates changes which have taken place in the location and character of the shoreline; and in a few instances, suggests the course of the explorations followed during the prosecution of the survey. All of these features, as well as the more strictly bibliographic facts, have been brought together. Among them may be found many which, heretofore, have been overlooked.

Early Continental Maps.

Ayllon's map, 1527.

The enthusiasm aroused in Spain by the return of Columbus and the narration of his successful voyage to the New World led many men of high rank and possessions to look to the new-found continent as a source of easily acquired wealth and increased power. Many requests for patents allowing explorers to possess any lands which might be discovered were filed with the royal officers in the years

immediately succeeding. Among the most hardy and most powerful of these enterprising Spaniards was Ayllon, who sent out between the years 1520 (?) and 1530 at least three expeditions to explore and gain for Spain, Christianity and himself the lands lying northward of the already discovered Florida coast. Early in June of 1526,

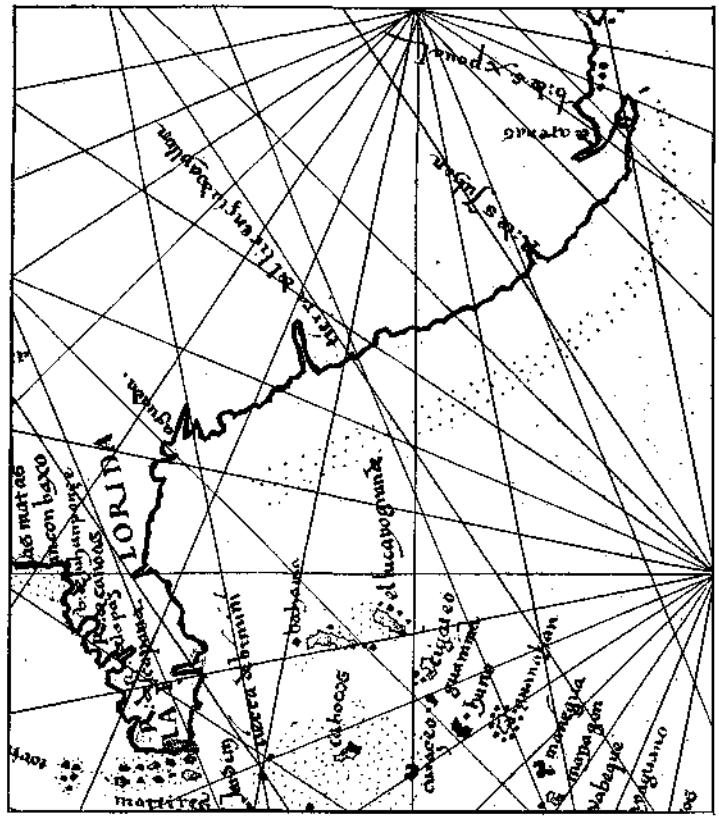


FIG. 27.—Portion of Ayllon's Map, 1527.

Ayllon sailed from Puerto de la Plata with three large vessels, which carried six hundred persons of both sexes, including clergymen and physicians, beside one hundred horses. They reached the coast [1] of

[1] J. G. Shea, "Ancient Florida" in Winsor's Narrative and Critical History of America, vol. ii, 1886, pp. 240-41.

Florida probably not far from the Wateree river, where they encountered their first misfortune in the loss of their brigantine. Ayllon immediately replaced this loss by a small vessel with which he explored the adjacent coast. His Indian guide, Francisco, deserted him, "and the parties sent to explore the interior brought back such unfavorable accounts that Ayllon resolved to seek a more fertile district." According to his original permit, he was required to run at least eight hundred leagues along the coast; and he, as well as Gomez, was to seek a strait or estuary leading to the Spice Islands. As the result of this expedition, the Chesapeake Bay was entered as possibly affording the passage sought. The soil of the country bordering on the bay, superior to that of the sandy region south of it, seemed to him better suited for the purposes of a settlement. He at last reached Guandape and began the settlement of San Miguel, where the English in the next century founded Jamestown. The map which was produced on Ayllon's return to Spain shows in a general way the position of the Chesapeake Bay, which it is supposed he entered and explored. His information, however, could not have been more than vague, as is shown by the accompanying figure, which represents the Chesapeake simply as an inlet with the phrase "tiera del licencia del Ayllon" (Fig. 27). This sketch is supposed to furnish the first representation of Chesapeake Bay based upon authentic information. In his work entitled *Die beiden ältesten General-Karten von Amerika*, Kohl gives the following reasons for considering the bay indicated on the map an attempt to represent the Chesapeake Bay:

"(Bay of St. Mary.) This bay Ribero puts between 34° and 35° N. lat. He places this there as quite important, extending for some distance from southwest to northeast and towards the sea he gives a row of small islands which have many entrances between them. He makes two rivers enter, one of which he calls 'R. del Espiritu Santo' (River of the Holy Ghost). The other is without a name. Oviedo calls it the 'R. Salado' (salt water river), and does not have it penetrate very far inland. I acknowledge that all these circumstances seem to indicate that this 'St. Mary's Bay' of Ribero or Ayllon is our present Pamlico Sound, which extends with the width indicated, is shut off from the sea by several small islands, offers different entrances and in its greatest expansion extends from northeast to southwest.

Nevertheless later geographers and maps make it more probable that

we must regard the St. Mary's Bay so often mentioned later and so well known among the Spaniards, not as our Pamlico Sound, but probably as our better known Chesapeake Bay.

Oviedo (about 1545) said that the 'Bahia St. Maria' in 30⅔° N. lat., lies midway between Cape San Juan and Cape Trafalgar. Much later Barcia places the bay repeatedly in 37° N. lat., which is exactly the latitude of our Chesapeake Bay. Diego Homem (1558) has this bay in 38°; Vaz Dourado in his atlas in 36½°. Diego Homem, however, sketches somewhat differently from Ribero. He gives a smaller entrance and leaves out the islands, although he has both of the rivers of Ribero which appear numberless times on the maps of the sixteenth century under the names given above. The 'R. del Espiritu Santo' is always directly to the left of the entrance of the bay. The 'R. Salado' is, however, at the right and penetrates generally northward into the land, and this circumstance as well as its name speaks also for Chesapeake Bay. It is this long northward trending channel of the bay filled with salt water which the Spanish are accustomed to designate as R. Salado. The 'R. del Espiritu Santo' would then be our James River.

The most decisive proof, however, for interpreting the 'St. Mary's Bay' of the Spanish as our Chesapeake Bay and not as Pamlico Sound I find in the report by the Spanish seafarer Don Pedro Menendez Marquez of his reconnaissance along this coast in the year 1573 which he made in order to produce a map of the same. This map was never published, but Barcia has retained for us verbal extracts of historically invaluable statements in the historical references.

In this report Menendez says—after he has mentioned a dangerous sandy promontory in 35° N. lat. which according to all conditions can be nothing else but our Cape Hatteras—that from this promontory the 'Bahia de St. Maria' lies 30 miles distant. This is very nearly the difference between Cape Hatteras and Chesapeake Bay. Then he describes very exactly and correctly the coast which lies between and finally sailing into St. Mary's Bay, he gives the following description of it: 'At the entrance this Bay is three leagues broad (exactly the distance between Cape Henry and Cape Charles). You sail into it, in a N. N. W. direction (that is the direction of the chief channel of the Bay). At the entrance on the southern side near the land the water has a depth of from 9-13 fathoms, on the north side, however, only 5-7 fathoms. Within the Bay itself you have 15-16 fathoms depth. Within the Bay are numerous harbors and rivers and on both sides ships may go for anchor.' These statements concerning the depths correspond very exactly with the depth conditions of our Chesapeake Bay, while they correspond just as little with our Pamlico Sound as the 'many appreciated harbors and rivers.'

All these circumstances, I believe, place the question beyond all doubt after the time when Oviedo wrote his second volume (about 1545?) and after the time when Menendez reconnoitred (1573). In order to explain the variations from our map of 1529 there remain only two means, namely, either to assume that at Ayllon's time they gave the name 'B. de Santa Maria' to Pamlico Sound or that Ribero and his authority erred somewhat as to the latitude of this bay.

For the first of these theories we have no support at all, since we know absolutely nothing of two 'St. Maria Bays' in this region. We are unable

to mention any mariner who could have introduced a second bay of this name. All geographers speak here always of St. Maria Bay only and all maps, whether they place this bay falsely in 35° or correctly in 37° north latitude represent this always according to the ancient example of Ribero and Ayllon with two rivers, as though supplied with two horns, with a 'Rio Salado' and 'Rio del Espiritu Santo.'

There remains, therefore, nothing else than to assume that the ships and the pilots of Ayllon certainly first discovered Chesapeake Bay in the year 1526, but that they erred a little regarding its latitude."

The map was produced by Kohl and bears near the main inscription the figure of a Chinaman and an elephant—tokens of the ancient belief in the Asiatic connections of North America. This vague outline of the coast has been reproduced in several well-known histories.[1]

RIBERO'S MAP, 1529.

The second map referred to and reproduced by Kohl in the above mentioned volume was drawn by Diego Ribero, a Portuguese, in the service of Spain, who was the Royal Cosmographer from 1523 to 1533. "As the official cosmographer of the Spanish Crown, and as one of the hydrographers consulted at the Badajoz conference of 1524, by which Alexander VI's line of demarcation dividing the world into two hemispheres between Spain and Portugal was finally decided on, . . . Ribero was especially qualified to design this map, . . . the most important of the early Mappes Mondi and the first in which the world was delineated in a manner that approaches the scientific accuracy of modern cartographers. It contains the first graphic record of many of the most significant discoveries that led to a knowledge of the true form of the globe, and as a masterpiece of exact and well-informed map construction stands far above the crude essays of Juan de la Casa, Amerigo Vespucci."[2] . . .

There has been considerable doubt as to the source whence Ribero drew his information, but later investigations have shown that this map clearly represents a record of the discoveries of Gomez, who was at one time a pilot on one of Ayllon's expeditions. Gomez, after

[1] Winsor, op. cit., vol. ii, p. 285; Brown, "Genesis of the U. S.," and "The Magazine of American History," vol. ii, 1878, p. 257.

[2] B. Quaritch Catalogue No. 129. November, 1892, p. 3.

sailing north and examining the coast of Labrador, turned southward and leisurely explored the whole coast from Cape Race to Florida. From this point he sailed to Santiago de Cuba and thence to Coruña, entering that port after ten months' absence. He failed to discover the desired channel to the eastern coast of Asia, and we have

FIG. 28.—Portion of Ribero's Map, 1529.

no detailed information regarding his explorations along the Maryland-Virginia coast beyond that furnished by the map of Ribero, which records his discoveries and gives many names along the coastline which were undoubtedly bestowed by Gomez. Shea seems to think that the larger bay given on the Ribero map represents the

Delaware, although there seem to be about equal grounds for assuming that the Chesapeake is the bay thus vaguely represented.

This map of Ribero, to judge from the fac-simile reproduction by Mr. W. Griggs, is a broad sheet 57x24 inches, colored and gilded. Quaritch,[1] however, seems to regard this copy as a somewhat reduced fac-simile. "Ribero's map served as a base for the Venice map of 1534,[2] and the Bellero map of 1554. With a slight modification, this map was used as an authority in so late a chart as Hood's, published in 1592."

"There are two early copies of this map, of which a small section is here given; both are on parchment, and are preserved respectively at Weimar and Rome, though Thomassy[3] says there is a third copy. The Roman copy is in the Archivio del Collegio di Propaganda Fide, and is said to have belonged to Cardinal Borgia. The North American sections of the map have been several times reproduced in connection with discussions of the voyages of Gomez and Verrazano. The entire American continent was first engraved by M. C. Sprengel in 1795, after a copy then in Büttner's library at Jena, when it was appended to a German translation of Muñoz, with a memoir upon it which was also printed separately as *Ueber Ribero's älteste Weltkarte*. . . . The most serviceable of the modern reproductions of the American parts is that given by Kohl in his *Die beiden ältesten General-Karten von Amerika*, though several other drafts are open to the student in Santarem's *Atlas* (pl. XXV), Lelewel's *Moyen-âge* (pl. XLI), Ruge's *Geschichte des Zeitalters der Entdeckungen*, and Bancroft's *Central America* (i, 146)."[4]

The Ayllon and Ribero maps, regarded by many as the work of the latter, together with those of Nuño, Garcia, and Detoreno, established a type of the American coastline which prevailed for some time. They represent the degree of information regarding the Chesapeake and its tributaries possessed by the highest authorities in Europe up to the beginning of the 17th century, when John White made his manuscript map of Virginia about the year 1585. Even this

[1] Quaritch's Catalogue No. 133. April, 1893, p. 2. [2] Stevens' notes.
[3] Les papes géographes, p. 118. [4] Winsor, op. cit., vol. iv, p. 38.

map, which extends only to the waters between the Capes, gives us no information regarding the territory now occupied by Maryland; and so far as we know, no information was gathered by actual exploration of the upper waters of the Chesapeake until John Smith made his well-known voyage along the eastern and western shores of the bay in 1608. Maps published between the time of the appearance of these earliest sketches, and the more detailed drawings of Smith, show some increase in the knowledge of the names given to the area; for instance, the map by Cornelius Judaeis entitled "Americae pars borealis, Florida, Baccalaos, Canada, Corterealis," 1593, published in his "Speculum Orbis terrarum," and reproduced by Winsor,[1] gives us such terms as "Chesepooc Sinus," "Virginia," and "Apalchen."

First Detailed or "Mother Maps."

At the beginning of the 17th century the people of Europe, and especially of England, made the first determined effort to plant colonies in America north of the Spanish possessions. A great wave of colonizing and exploring excitement swept over the country and resulted in the development of small communities in New England, New York, Delaware and along the shores of the Chesapeake.

Earlier attempts had been made by Sir Walter Raleigh to found a colony in Virginia, but these were all unsuccessful, so that the first settlement which may be regarded as permanent in the territory adjacent to the present limits of Maryland is that of Virginia, established early in April, 1607. The colonists embarked from England in three small vessels of less than 100 tons each and sailed for America by the circuitous route of the Canary and West India Islands. Among their number were several adventurous spirits, notably Captain John Smith, Bartholomew Gosnold and Captain Christopher Newport. These one hundred and five colonists, filled with enthusiasm for their project and a desire to obtain more settlers for the community, set about to explore the land in which they dwelt and sent back to England glowing accounts of the country which they possessed. The zeal and enthusiasm of some of the leaders led to

[1] Op. cit., vol. 4, p. 97.

an exploration and mapping of Chesapeake Bay and to the publication of Smith's map, which "is absolutely the first engraved picture of English America and the first account of its real colonization."[1]

THE SMITH MAP.

The leader in all this work, Captain John Smith, was a man of marked personality. His reputation has varied in the minds of historians. By some he is considered a rival to Munchausen, by others a much maligned Christian gentleman. It is interesting in this connection to note the words of John Fiske, the most voluminous and accurate historian of Colonial America, as he remarks in his "Old Virginia and her Neighbors" (Vol. 1, p. 118), that "Smith's map is a living refutation of John Smith's detractors; none but a man of heroic mould could have done the geographical work involved in making it."

Born in Lincolnshire, January, 1579, Smith, before reaching the age of sixteen, had determined that the inactive life of a counting room was unendurable. During the years when most of the present generation are preparing for active life, Smith became a soldier of fortune and experienced more vicissitudes before attaining his majority than fall to the lot of ordinary men during an entire lifetime. He traveled on the Continent, fought in Transylvania, was a slave in Turkey, a fugitive in Russia and a knighted nobleman of Transylvania before he was twenty-five. Although but little over twenty-seven years of age when he landed in Virginia, he soon became the president of the Council and the ruling spirit of the colony, while his presence among them was necessary to the well-being and safety of the colonists. Although the means of saving the colony from starvation, Smith became the subject of many intrigues during the two years which he spent at Jamestown.

In the summer of 1608, to avoid encounters with his personal enemies in the colony, Smith determined to carry out the "instructions given by way of advice for the intended voyage to Virginia" by the London Virginia Company, which commanded as follows: "You

[1] Quaritch, 1880, p. 1242.

must observe if you can whether the river on which you plant doth spring out of mountains or out of lakes. If it be out of any lake, a passage of the other sea will be more easy, and is like enough, that out of the same lake you shall find some spring which runs the contrary way towards the East India sea." With little notion of finding a short cut to the east coast of Asia, Smith undertook to explore the Chesapeake. According to his "map of Virginia," published at Oxford in 1612—

"On the second of June, 1608. *Smith* left the fort, to perform his discoverie; with this companie.

Walter Russell Doctour of Physicke		Anas Todkill	Sould.
Ralph Morton		Robert Small	
Thomas Momford		Iames VVatkins	
William Cantrill	Gent.	Iohn Powell	
Richard Fetherstone		Iames Read, blacke smith	
Iames Bourne		Richard Keale, fishmonger	
Michael Sicklemore		Ionas Profit, fisher	

These being in an open barge of two tunnes burden . . . . Leaving the Phoenix at Cape-Henry, we crossed the bay to the Easterne shore, and fell with the Isles called *Smiths* Iles." [1]

The following extracts from the above-mentioned work give some notion of the course which these early explorers took and the many difficulties which they encountered in their first trip along the banks of Maryland territory:

"Passing along the coast, searching every inlet and bay fit for harbours and habitations: [and] seeing many Iles in the midst of the bay, we bore vp for them; but ere wee could attaine them, such an extreame gust of wind, raine, thunder, and lightning happened, that with great daunger we escaped the vnmercifull raging of that ocean-like water.

The next day, searching those inhabitable Iles (which we called Russels Isles [Tangier]) to provide fresh water; the defect whereof forced vs to follow the next Easterne channell, which brought vs to the river *Wighcocomoco* [Pocomoke] " . . .

We digged and search many places but ere the end of two daies, [the length of time devoted to the study of Somerset and Wicomico counties] wee would haue refused two barricoes of gold for one of that puddle water of *Wighcocomoco*.

[1] The Proceedings of the English Colonies in Virginia since their first beginning from England in the yeare of our Lord 1606, till this present 1612, with all their accidents that befell them in their Iournies and Discoveries. By W. S. At Oxford. Printed by Joseph Barnes, 1612.

Being past these Isles, falling with a high land vpon the maine, wee found a great pond of fresh water; [ ] but so exceeding hot, that we supposed it some bath. That place we called Point ployer.

Being thus refreshed, in crossing over from the maine to other Iles, the wind and waters so much increased with thunder lightning and raine, that our fore-mast blew overbord; and much mightie waues overwrought vs in that smal barge, that with great labour wee kept her from sinking, by freeing out the water.

2 daies we were inforced to inhabit these vninhabited Iles; which (for the extremitie of gusts, thunder, raine, stormes, and il weather) we called *Limbo.* [Hooper's or Kedge's Straits.]

Repairing our fore saile with our shirts, we set saile for the maine; and fel with a fair river on the East called Kuskaranaocke [Nanticoke?], [later] wee *returned to Limbo. . . . But finding this Easterne shore, shallow broken* Isles, and *for the mostpart without fresh* water, we passed by the straits of *Limbo* for the Westerne shore; so broad is the bay here, we could scarce perceiue the great high clifts on the other side: by them we Anchored that night and called them *Riccards Cliftes* [Calvert Cliffs]. 30 leagues we sayled more Northwards not finding any inhabitants, leaving all the Eastern shore, lowe Islandes, but ouergrowne with wood, as all the Coast beyond them so farre as wee could see; the Westerne shore by which we sayled we found all along well watered, but very mountanous and barren, the vallies very fertile, but extreame thicke of small wood so well as trees, and much frequented with wolues, Beares, Deere, and other wild beasts. We passed many shallow creekes, but the first we found Navigable for a ship, we called *Bolus* [Patapsco]."

Beside all the difficulties arising from lack of water, Smith was hampered by the choice of his companions and the lack of sufficient food to keep the party in spirits. How low their spirits became is shown by the following extract from Purchas:[1]—

"The barge Smith went in was hardly two tunnes and had in it but twelve men to performe this Discouery, wherein they lay aboue the space of twelve weekes vpon those great waters in these vnknown Countries, having nothing but a little Meale or Oat-meale and water to feed them, and scarce halfe sufficient of that for halfe that time, but that by the Sauages, and by the plenty of fish they found in all places, they made themselves prouision as opportunity served; and yet they had not a Mariner or any that had skill to trimme their Sayles, vse their Oares, or any businesse belonging to the Barge, but two or three. The rest being Gentlemen, or as ignorant in such toyle and labour, yet necessitie in a short time by their Captaines diligence and example taught them to be become so perfect, that what they did by such small meanes, I leaue to the censure of the Reader to indulge by this Discourse and the annexed Map."

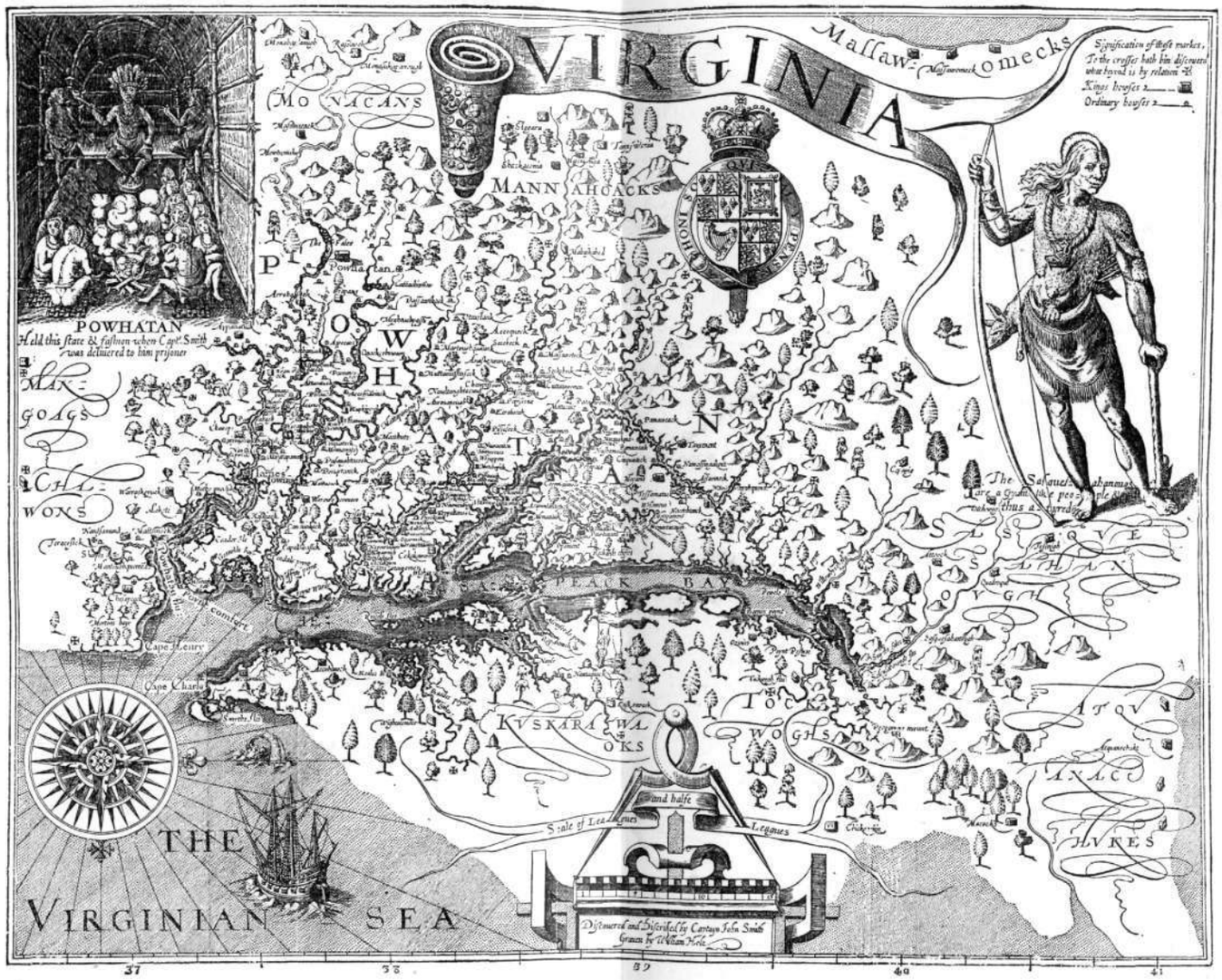
Smith, while lying off the present harbor of Baltimore [June 13 (?)], attempted to overcome the despondency of his companions

[1] Purchas his Pilgrimes, 1627, vol. 4, leaf 9, chapter 3, p. 1693.

with a grandiloquent speech, which has come down to us in his account of this voyage. It served only to revive his companions temporarily, however, for after three or four days of rainy weather we find the whole company returning to the Potomac, which they reached June 16. They sailed up the Potomac some thirty miles to Onawfarment [a small Indian town on the Virginia shore opposite the mouth of Wicomico creek]. There they had trouble, and finally, after exchanging hostages, "James Watkins one of the soldiers was sent six miles up the woods to their Kings habitation." The next day they sailed near the present location of Washington, whence they went nine or ten miles up the country in search of an antimony mine. They arrived at Jamestown, June 21, after having spent scarcely two weeks in an exploration of nearly a thousand miles of shore line.

Later in the summer Smith made a second and more successful attempt to explore the headwaters of the Chesapeake. Leaving Jamestown on the 24th of July, he picked up the lines of his exploration at the "Bolus" on the 28th or 29th inst. Two days were spent in exploring the Gunpowder and Bush rivers, when the party crossed the head of the bay and had an encounter with the local Indians. Smith evidently stayed about Port Deposit and North East a week or two parleying and treating with the Susquehanna Indians, who came down the river to meet the alleged conqueror of the Massawamacks. No doubt some of this interval of waiting was used in exploring the land north of Elkton and bordering the Sassafras river, for we find indications that Smith visited Gunther's Harbor [North East] and Peregrin's Mount [Gray's Hill (Bozman) or Beacon Hill (Johnston)]. So far as the map and the account indicate, little or no time was spent after the conference with the Indians in exploring the shores of the bay, for we find that considerable time was spent in exploring the Rappahannock as far west as Fredericksburg before the return of the party to Jamestown, where they arrived September 7.

Smith continued his explorations of the country about the settlement of Jamestown in the succeeding year. During one of his trips up the James, while lying on a bag of gunpowder in a canoe, the



SMITH'S MAP, 1608 (REDUCED).

FROM WINSOR'S NARRATIVE AND CRITICAL HISTORY.

powder became ignited and Smith very nearly lost his life through jumping overboard in his frenzy of pain. The injuries he underwent were so severe that he left Jamestown on the 4th of October, 1609, having spent scarcely two and a half years in exploring an unknown country and establishing a colony which was successful during his presence among the colonists but destined to decline as soon as his personal influence with the Indians and with the people was removed.

Little can be gained as to the amount of money expended in the preparation of the manuscript of this map. The only facts which have been met with are found in Purchas' account, in which he quotes Smith as saying the "beginnings here and there cost me neare 5 yeares [1604-1609] worke, and more than 500 pounds of my owne estates, besides all the dangers, miseries, and incumbrances I endured gratis; where I stayed till I left 500 better provided than euer I was."

This historic map is 11.5 inches high by 14.75 broad. At the upper left and right-hand corners as shown in Plate XLIII[1] are sketches illustrating incidents in Smith's life during his stay in Virginia, while between the two unrolls an ornate scroll with the inscription "Virginia," and just below is the coat-of-arms of the ruling house in England. In the lower left-hand corner is the "Virginian sea" bearing the representation of a contemporaneous vessel and the compass; in the centre at the base is a pair of drawing compasses and a "scale of Leagues and halfe Leagues" with the inscription "Discouered and Described by Captayn John Smith 1606" [O. S.]. On later editions of the map Smith's coat-of-arms, with its "Three Turks' heads,"[2] is drawn in a somewhat inconspicuous manner to the right of

[1] This plate is published by permission of Messrs. Houghton, Mifflin & Co., publishers of Winsor's Nar. and Crit. Hist. of America, from which the plate is taken.

[2] This shield with its "three Turks' heads" and its motto recalls one of Smith's most successful adventures. He was a soldier under Count Meldritch during the siege of a fortress at Gegal. The siege became monotonous so Lord Turbashaw challenged any captain in the besieging army to single combat. Smith accepted the challenge and came off victor with the head of the Lord Turbashaw. Grualgo, resolving to avenge his bosom friend, challenged Smith. They met and Grualgo's head was carried

the scale of leagues. The two larger figures are of sufficient interest to warrant a more extended notice. The picture on the left, with the inscription "Powhatan Held this state & fashion when Capt. Smith was delivered to him prisoner 1607," refers to one of the events rendered familiar by the story of Pocahontas. Smith, taking only two of the party which had left Jamestown with him some days before to explore the Chickahominy river, started in a small canoe to search the headwaters of the stream. During this attempt he was captured by the Indians after the death of his two companions. As an unusual prisoner he was taken to the emperor of the local tribes Powhatan, before whom he was tried and condemned to death. This sketch represents the customary manner of holding the council, while a similar sketch on the map of "Ould Virginia" illustrates the incident of his rescue by the generous pity of Pocahontas.

The figure of the Indian on the right is thus described by Smith:

> The picture of the greatest of them [the Susquehanocks] is signified in the Mappe. The calfe of whose leg was 3 quarters of a yard about: and all the rest of his limbes so answerable to that proportion, that he seemed the goodliest man that euer we beheld. His haire, the one side was long, the other shore close with a ridge over his crown like a cock's combe. His arrowes were fiue [5] quarters [of a yard] long, headed with flints or splinters of stones, in forme like a heart, an inch broad, and an inch and a halfe or more long. These he wore in a woolves skinne at his backe for his quiver, his bow in the one hand and his clubbe in the other, as is described.

Of the many little houses represented on the map, ten of them are within the limits of Maryland and represent the principal Indian towns rather than any European settlement, since none of the latter had been made in this area at the time Smith made his explorations. Trees which are scattered over the map are evidently intended to represent in some degree both the size and the character of the forest-growths. There are four different types varying in abundance.

off in triumph. Finally Smith challenged any of the besieged and Bonny Mulgro accepted only to furnish the third head. For all these successes Smith was made a major, and received a patent of nobility and a coat of arms with three Turks' heads in a shield with the motto "Vincere est Vivere." The reproduction in Scharf and other histories seems to be a new drawing of a late copy since it lacks any page number and has this motto spelled "vincere est vinere," evidently a copyist's substitute of an *n* for the *u* in the old spelling "*viuere*."

In the territory of Maryland twenty-seven of these are oval-shaped, representing perhaps the pine, seven are what may represent the cypress, and seven others the tulip or poplar, while the remaining sixteen may be intended to represent the development of maples and oaks. Thus there are fifty-eight of these little figures scattered over the state, thirty-two being situated on the western shore and twenty-six on the eastern shore. Neither animals nor Indians appear in the Maryland portion of the map, though such occur in the territory southwest of Jamestown. The difference between the lowlands of our Coastal Plain and the more rugged scenery of the Piedmont Plateau was recognized by the explorers, and is indicated by the lack of any little hills or mountains on the area southeast of the line connecting Naebrughquena [Washington] and Gunther's Harbor [North East]. Three little hills are near the Patuxent river and are evidently intended to represent Rickards [Calvert] Cliffs. In the western portion of the map, near the headwaters of the Potomac, is represented a somewhat larger mountain with three peaks which probably indicates that Smith learned something of the size and location of the Blue Ridge.

A careful study of the features represented in a reproduction of this map, and a comparison with our knowledge of the country, lead to the following estimate of the work done: First leaving Virginia at Watkins Point the lines, although rounded and generalized, show a careful exploration and sketching of the necks between the Wighco [Pocomoke] and the Kus [Nanticoke]. Just north of Watkins Point there is an attempt to represent Crisfield harbor and James Island Marsh and the course of the Big Annemessex river, which apparently was not entered, as its length seems to have been estimated by the breadth of its mouth. There is an evident attempt to represent the most prominent indentations on Potato neck, such as Mine creek and Teague creek, but from Hazards Point to the point between the Manokin river and Moine Bay the sketching is poor. Deal's Island and Low's Thoroughfare seem to have been noticed and some effort made to represent Haines Point, Back creek and Long Point. Smith evidently passed directly across Moine Bay from

the southern point to the mouth of the Nanticoke, since Wingates Point between the Moine and the Wicomico is not noticed. The Nanticoke was explored and platted to some point not far from the present town of Seaford, Delaware. That Smith went no farther is indicated by the little Maltese cross beyond which, according to the legend, the information is all hearsay. The inaccuracies of the map show that after exploring the Nanticoke, Smith passed through Limbo[1] [Hooper's Straits] and sailed for a short distance along the coast, perhaps to James Point, and then left the eastern shore unexplored at least to the northern end of Kent Island. The map seems to indicate that he left the coast before reaching Barren Island and that he sketched the shore line as it appeared to him during his quartering across the bay, a view which is substantiated by Smith's own words. This deflection to the western shore explains the generalized lines of the Winstone Isles, especially on their eastern sides, where they are clearly separated from the mainland. The interpretation of these isles as given in Scharf, seems to be the more natural one, for it is very evident from the map that "he [Smith] clearly mistook the deeply indented peninsulas of Dorchester and Talbot counties for islands which he grouped with Kent Island to form the three Winstone Isles."

North of Kent Island, as the shores of the bay approach each other, the accuracy of detail seems to be much better. "Bomes poynt" seems to be intended for Swan Point with its two creeks on the southeast and somewhat regular northwestern shore line. The outlines of what probably are intended for the Sassafras and Elk rivers suggest that in this part of Smith's exploration he became somewhat turned about as to his location on account of cloudy weather, or, as Herman found later, a troublesome tribe of Indians. The course of the Sassafras from its mouth upward, turns more to the south than it should. This, if we may trust the crosses, is not due to lack of exploration, for Smith professes to have traced the course to some point near the pres-

[1] It is usually considered that "Limbo" represents Hooper's Straits, the inference being based, apparently, on the assumption that such would be the normal course. The map, however, represents several small islands between the larger [Bloodsworth's?] island and the mainland which are not found on any of the later Coast and Geodetic Survey maps. There is therefore cause for doubt as to the accuracy of this location.

ent head at Sassafras P. O., and the account of his second tour of discovery shows that considerable time was spent about the head of the bay parleying with the Indians and visiting their settlements. The course of the Elk is more carefully outlined, though even here there seems to be a failure to appreciate the relative size of the eastern and western creeks, due perhaps to the more marshy character of the land in the seventeenth century.[1] The northeastern corner of the map about the head of the bay discloses the prevailing misconception as to the position of the 40th parallel of latitude. It was thought to cross the Susquehanna just south of the present town of Port Deposit [39° 36′ N.].

The outline of the western side of the head of the bay is drawn less accurately than the eastern. Spesutie Island forms part of an unnamed headland, while the area between this and Bush river is represented as a big bog or marsh. "Willowbyes flu" [Bush river] is very loosely drawn and apparently is based on imagination rather than accurate information. Smith may have had some basis for the three head streams in the three creeks rising in the vicinity of Jarrettsville, but it seems more natural to regard this as an instance of a happy chance generalization. "Powels Iles" is probably a generalization for Pool's Island off the mouth of the Gunpowder. The rest of the shore line indicates either that there is a very loose generalization of marshy lowlands or that some of the smaller points and islands are of recent development, probably the former. The outline of the Bolus river bears a fairly close resemblance to the Patapsco of to-day until one reaches the union of the two branches above Woodstock, when the streams seem to have been confused in their relative importance. The "Blands. C" of later editions may represent Mineral Hill or some other mineral locality to which the Indians might have conducted Smith. The shore line of Anne Arundel county is very much generalized considering the prominence of its features and it becomes difficult to associate satisfactorily the various unnamed bays and headlands with those known to-day. Smith clearly saw the highly indented character of the shore, but bad weather, illness and discontent on the first voyage, together with eager haste on the

[1] See Danker and Sluyter's Journal.

second, leave these topographic features very inadequately represented in comparison with the earlier work on the Eastern Shore.

The Patuxent river is more accurately outlined than some of the work on the Eastern Shore, but its straight course seems to have been overlooked while the western branch is entirely unrepresented. There is no cross on the map to indicate that this stream was explored at all. If this be true, the representation is *exceptionally* accurate for the information at Smith's command. Rickards Cliffs are represented by three or four elevations, the only ones placed on the Coastal Plain. The bay between Cedar Point and Point No Point left a strong impression, for it is delineated as fully ten miles deep. From the shading it may be suggested that part of the present land was then marsh land.[1]

Smith's representation of the shores of the Potomac should be the most accurate portion of the Maryland territory, for he spent considerable time along the coast and was not as much disturbed by storms, illness and Indians. A comparative study of the lines shows, however, that the details laid down on the map represent a far greater irregularity of the coast line than is now displayed. No points can be accurately correlated between Point Lookout [Sparkes poynt] and Port Tobacco [Potapaco]. There is a similarity in location of prominent points and well-marked bays, but on the whole the re-entrants and intervening salients are drawn too sharply angular. There is no doubt that some local changes have taken place along the Potomac since the beginning of the seventeenth century, but an interpretation of the drawings involving changes in the character of the coast line should not be pushed too far. The upper portions of the river show the same tendency to represent the water-line as more intricate than it is to-day. The Piscataway river is recognized but unnamed. The same is true of the Anacostia. Beyond Great Falls the course of the Potomac is straightened and generalized and is of little value.

There has always been some dispute as to just when the Smith

[1] The present topographic sheets do not contradict this view since the lands immediately adjacent to the shore are low and there is a moderately well marked ridge half to three-quarters of a mile back of the present water line.

THE HELIOTYPE PRINTING CO. BOSTON

CALVERT CLIFFS, ON THE CHESAPEAKE BAY.

map was drawn. It is the common opinion at present that the sketch of this map was made subsequent to the sailing of Captain Nelson in June, 1608, and that it was completed and ready for shipment in the fall of the same year. This view is based upon the fact that no mention is made of it in the title of the "True Relation," which was entered at Stationer's Hall, London, August 13, 1608, under the following title, which differs from the printed one, as it mentions Nelson's name: "A true relation of such occurrences and accidents of note as have happened in Virginia synce the first planting of that Colonye which is nowe resident in the south parte of Virginia till master Nelson's comminge away from them, etc." [1]

The opinion that the map was finished before November of 1608 is based upon a letter which Smith wrote "to the Treasurer and Councell of Virginia" before the sailing of Captain Newport on that date. This letter was not printed till 1624 in the third book of Smith's "General Historie." In the copy of this letter given by Brown in his "Genesis of the United States," we find the following:

"Now that you should know, I have made you as great a discovery as he, for lesse charge than he spendeth you every meale; I haue sent you this Mappe of the Bay and Rivers, with an annexed Relation of the Countries and Nations that inhabit them, as you may see at large. Also two barrels of stones, and such as I take to be good Iron ore at the least; so devided, as by their notes you may see in what places I found them."

This map arrived in England in January, 1609, and Phillips [2] has shown that it must have been published prior to the Oxford edition of "A Map of Virginia, With a description of the Coventry." This view is based upon the following extracts from "Purchas His Pilgrimage," folio, London, 1613, p. 1634, and entered at Stationer's Hall August 7, 1612.[3]

"Concerening the latter, Captain Iohn Smith, partly by word of mouth, partly by his Mappe thereof in print, and more fully by a manuscript which hee courtiously communicated to mee, hath acquainted mee with that whereof himselfe with great perill and paine, had been the discouerer, being in his discoueries taken prisoner, and escaping their furie, yea receiving much honour and admiration among them, by reacon of his discourses to them of the motion of the Sunne, of the parts of the World, of the Sea, etc.,

[1] Phillips, "Virginia Cartography," Smithsonian Misc. Collections, No. 1039, 1896, p. 21. [2] Op. cit., p. 22.

[3] "Purchas His Pilgrimes" is a distinct work published somewhat later.

which was occasioned by a Dyall then found about him. They carried him prisioner to Powhatan, and there beganne the English acquaintance with the Sauage Emperour."

The first part of "A map of Virginia" is evidently an expanded and revised text of that "Mappe" and "Relation" referred to in the letter to the Treasurer and Council. It is a circumstance of extraordinary rarity to find the genuine map in this book of 1612, for most of the impressions seen are taken from the same plate, which was used subsequently for the map of Virginia in Smith's "Generall Historie" and "Purchas His Pilgrimes." In the former instance the reference to "Page 41 Smith" was added in the right-hand lower corner and in the latter the reference "1690" or "1691" was superadded in the upper left-hand corner. There are thus at least six impressions of the Smith map which are original. The first is referred to in "Purchas His Pilgrimage" and is without figures in either upper or lower right-hand corners. [Harvard Library.] The second was intended for "Purchas His Pilgrimes" and has the pagination 1692 or 1693 at the top. This copy lacks names for several localities mentioned in the third impression, which was published in Smith's "Generall Historie," 1624. This latter impression has "41 Smith" in the lower right-hand corner. Subsequently the Purchas pagination appears on the revised impression of Smith and may be "1690" or "1691." One of these two impressions has also no engraver mentioned, and the date 1606 directly under "Discouered and Described" and not under Smith as in the others. The fac-simile reproductions so far as seen seem to be based upon one of the later Purchas' impressions. That in the edition of Smith's works by Edward Arber[1] has the figures "Page 41 Smith" and "1691." The fac-similes published in local histories, like that in Scharf's History of Maryland, differ from one another, but all have the error of writing Smith's motto "vincere est vinere" instead of "vincere est viuere." The copy in Scharf likewise lacks the numbers indicating the pagination. The present reduction (Plate XLIII), which is from Winsor's Narrative and Critical History,[2] is without the pagination and the personal coat-of-arms of the later editions, and is somewhat different in the southeast corner.

[1] English Scholar's Library No. 16, Birmingham, 1884. [2] Vol. iii, p. 166.

Smith's map was the source of information for almost all of the maps which were published during the fifty years succeeding its first appearance. Winsor gives a list of many which are believed to be based on this copy, and Phillips enumerates, in the course of his descriptions, many others similarly influenced.

According to Winsor, De Bry "re-engraved it in part xiii of his *Great Voyages*, printed in German, 1627, and in Latin, 1634; and in part xiv in German in 1630 (*Carter-Brown Catalogue*, i, 370-71). It was also re-engraved for Gottfriedt's *Newe Welt*, published at Frankfort, and marked "Erforshet und beschriben durch Capitain Iohan Schmidt." The compiler of this last book was J. Ph. Abelin, who had been one of De Bry's co-workers, and he made this work in some sort an abridgment of De Bry's, use being made of his plates, often inserting them in the text, the book being first issued in 1631 and again in 1655. (Muller's *Books on America* (1872), No. 636, and (1877) No. 1,269.) The map was next used in two English editions of Hondy's *Mercator*, "Englished by W. S.", 1635, etc., but with some fanciful additions, as Mr. Deane says (Bohn's *Lowndes*, p. 1103). The map of the coast in De Laet, 1633 and 1640, was, it would seem, founded upon it for the Chesapeake region; cf. also the map of Virginia and Florida called "par Mercator," of date 1633, and the maps by Bleau, of 1655 and 1696.

Once more Smith's plot adorned, in 1671, Ogilby's large folio on *America*, p. 193, as it had also found place in the prototype of Ogilby, the Amsterdam Montanus of 1671 and 1673. In these two books (1671-73) also appeared the map "Virginiae, partis australis et Floridae, partis orientalis, nova descriptio," which shows the coast from the Chesapeake down to the 30th degree of north latitude.

Smith's map was finally substantially copied as late as 1735, as the best available source, in *A Short Account of the First Settlement of the Provinces*, etc., London, 1735,—a contribution to the literature of the boundary dispute, and was doubtless the basis of the map in Keith's *Virginia* in 1738; but it finally gave place to Fry and Jefferson's map of the region in 1750.

A phototype fac-simile, reduced about one quarter, of the earliest state of the original map in the Harvard College copy of the Oxford tract of 1612 is given herewith. A similar fac-simile, full size, is given in Mr. Deane's reprint of the *True Relation*, though it was not published in that tract. A lithographic fac-simile, full size, but without the pictures in the upper corners, is given in the Hakluyt Society's edition of Strachey, p. 23. Other reproductions will be found in Scharf's *Maryland*, i, 6, Scharf's *Baltimore City and County*, 1881, p. 38, and in Cassell's *United States*, p. 27. That in the Richmond (1819) reprint of the *Generall Historie* is well done, full size, on copper. This copper-plate was rescued in 1867 from the brazier's pot by the late Thomas H. Wynne, and at the sale of his library in 1875 was purchased for the State Library of Virginia."

Winsor[1] evidently made a mistake in regarding the Lord Baltimore

[1] The Kohl Collection of maps relating to America. Bibliographical Contributions No. 19, Harvard University, 1886, p. 38.

map as a copy of that by Smith, since the proportions are different and the character of the eastern shore and the names of the local points are quite unlike.

No one can realize the conditions under which Smith made his explorations and drew his map or study the features there laid down without being impressed with the wonderful fidelity and geographical sympathy with which he recognized and portrayed the principal features of the country through which he traveled. If all knowledge of the region were lost it is doubtful if many, even of the most highly trained topographers with Smith's instruments and methods, could spend less than a month in exploring Chesapeake Bay and produce a sketch of the country which would be as free from distortion and exaggeration as the map drawn by Smith in 1608. Yet during all of Smith's explorations he was journeying along unknown shores, surrounded by a sick and discouraged company without healthy food and liable to attack from numberless and cruel savages.

THE LORD BALTIMORE MAP, 1635.[1]

The Lord Baltimore map, according to the fac-simile reproduction in Ogilby's *America*, is 9 by 11 inches and includes the territory from Cape May and Harper's Ferry on the north to Cape Henry and Jamestown on the south. The title "Nova Terrae-Mariae tabula" is framed in a scroll, and the various portions of the map are ornamented by the coat-of-arms of the king and of the Calverts, a fancy scale of 20 sea leagues, and a compass.

The mapping of the Maryland territory is far below that of Smith, although it seems as if the latter had been seen by the compiler of the present map. It is evident that Smith, if followed at all, was used more or less from memory, for the Baltimore map is distorted and generalized so far that the local points are rarely determinable. Beyond the presence of "Wighco flu." [Pocomoke], "Watkins point" and the three islands along the eastern side of the bay, there is little to suggest the accuracy and detail of the Smith map.

The principal features which are new in this sketch fall into two

[1]Through an error in proof-reading, this map was credited to Herman in the author's list of maps published in vol. i of this series.

divisions, viz., the improvements over Smith, and those features in which this map is less valuable than the earlier one. We find that

FIG. 29.—The Lord Baltimore Map, 1635, reduced.

the neck of land south of the Little Choptank is more fully recognized and delineated than in the Smith map, and that English names are

given to several points on the Potomac river; such as "St. Michaells Poynt," "St. Maries," "Heron Iland," "S. Clement Ile," and "Cedar Poynt." Port Tobacco has already become "Portobacke" in place of the "Potapaco" of Smith, while the name "Pascatoway" has been applied to a tributary of the Potomac, already recognized but unnamed by the latter. The errors in the map arise from a too bountiful scattering of mountains over all of the eastern shore and in two or three places on the western shore. There is none of Smith's care exercised in the position of these mountains, though there is an evident effort to represent the Calvert Cliffs and the higher land near Elk Ridge Landing. The outlines of the upper bay are very poor and the Susquehanna is represented as smaller than the North East, while the unnamed Patapsco is regarded as a large bay. The most interesting feature of the map which has been emphasized in all of the discussions of the southern boundary is the dotted line indicating the southern limits of Lord Baltimore's territory as claimed by the Proprietor. This line runs west from Chincoteague inlet to some point below Smith's Point (Cinquack), thence along *on* the southern bank of the Potomac to Potomac or Acquia creeks, probably the latter, up which it runs on its southern bank.

This map was first published in a pamphlet with the following title page:

"A Relation of Maryland; Together with a Map of the Country, The Conditions of Plantation, His Majesties Charter to the Lord Baltemore, translated into English. These bookes are to bee had, at Master William Peasley,[1] Esq.; his house, on the back-side of Drury Lane, neere the Cock-pit Playhouse; or, in his absence, at Master Iohn Morgan's house in high Holbourn, over against the Dolphin, London, September the 8. Anno Dom. 1635." 1 p. l. 56, 25 pp. sm 4° 1 fold. map.

The earlier pamphlet relating to Lord Baltimore's Maryland colony, published the preceding year and entitled "A relation of the successful beginnings of the Lord Baltimore's Plantation in Mary-land, being an extract of certaine letter's written from thence by some of the Adventurers to their friends in England. [London] Anno Dom. 1634," 1 p. l. 14 pp., did not contain a map. Most of

[1] Wm. Peasley was a brother-in-law of Lord Baltimore.

the original copies of the later work now extant lack the map, but Phillips reports a perfect copy in the Library of Congress.[1]

Several reproductions either in fac-simile or on reduced scale, as in the present instance, have been made of this Baltimore chart. Full sized fac-similes are found accompanying a reprint of the "Relation" made by Francis L. Hawkes in 1865[2] in a "Map to accompany the report of the Commissioners of the Boundary Line between Virginia and Maryland, 1873." Reduced reproductions have also been given in several local histories as well as in Scharf's History of Maryland,[3] and Winsor's Narrative and Critical History of America.[4]

THE FARRER MAP, 1651.

The Lenox Library in New York possesses a supposed representation of the country drawn by Virginia Farrer, entitled "A mapp of Virginia discouered to ye Hills, and in it's Latt: From 35 deg: & 1/2 neer Florida to 41 deg: bounds of new England," which is here reproduced after Winsor. Virginia Farrer, according to various volumes of biography, was the daughter of John Farrer and the niece of Nicolas Farrer, who was at one time connected with the London Virginia Company. She remained a spinster and died in January, 1687. This map of the Farrers is a strange mixture of truth, imagination and probably willful misrepresentation, since contemporaneous maps such as that by Speed were much nearer the truth. The original sheet from which Winsor made his somewhat reduced fac-simile is 10.5 by 13.75 inches and was owned by Mr. John Cadwalader of Philadelphia. The fac-simile is here reproduced as Plate XLV,[5] and from it is derived the following description:

The entire map has a marked warp to prove that "in ten dayes march with 50 foote and 30 horsemen from the head of Ieames River, ouer those hills and through the rich adiacent Vallyes beautyfied with as proffitable rivers which necessarily must run into y^t^ peace-

[1] Op. cit., p. 28. [2] Sabin's Reprints, vol. i, No. 6. [3] Vol. i, p. 529.
[4] Vol. iii, p. 525.
[5] Nar. and Crit. Hist., iii, p. 465. This map is published with the permission of Messrs. Houghton, Mifflin and Co., who allowed electros to be taken from the Winsor plate.

full Indian sea" one might arrive in New Albion [California] "to the exceeding benefit of Great Britain, and soye of all true English."

The mountains which have the regular northerly trend first noticed in Blaeu, 1635, may stand, as Winsor says,[1] "for the Appalachians seen from the east, and for the Sierra Nevadas seen from the west, involving a complete annihilation of the great Mississippi Valley, if nothing more, which, to be sure, Marquette has not yet discovered, but which some geographers, certainly for a century, had had due conception of so far as it represented a great breadth of continent."

The fact that the Massawomeckes, the great enemies of the Susquehannocks, inhabited this country shows that the Farrers were thinking more particularly of the Appalachians. It is hardly worth while to discuss in detail a map on which the Hudson empties into the sea in the same latitude as the head of the Chesapeake and rises in "A Mighty great Lake" which empties into the "Sea of China and the Indies."

The differences between this map and that by Smith are marked. The eastern shore is much more cut up; the Pocomoke, which is unnamed, is too broad, and the name Rappahanok seems to have been applied to the Nanticoke and not to the Little Choptank or Fishing Bay as Smith used it. Choptank river also is roughly outlined and there is a river emptying into the bay not far from Worton Point which is possibly intended to represent the Chester. This flows northwest and is called the "Elk," although the present Elk is indicated without any name. The Sassafras is present as the Tunhanok, probably of the same derivation as Smith's "Tockwogh flu." The course of the Susquehanna, which is very similar to that given by Smith, is broader, however, and feels somewhat the distortion necessary to conform to the general notion of the map. The western shore of Maryland is even more poorly drawn than the eastern shore and gives nothing new beyond the fact that "the Lord Baltimor's Plantation begun in 1635." St. Mary's is located on the "Maryland river," while the name "Pataomak" is reserved for Acquia creek.

A portion of Baltimore county north of the mouth of the Bolus

[1] Mass. Hist. Soc. Proc., xx, p. 102.

FARRER'S MAP, 1651 (REDUCED).

FROM WINSOR'S NARRATIVE AND CRITICAL HISTORY.

[Patapsco] is called "Anandale C." The information that "Checepeacke" is 200 miles long is probably derived from the text describing Smith's map. The latitude of 40° N. lat. is close to the mouth of the Hudson.

THE ALSOP MAP, 1666.

Fifteen years after Farrer's work appeared, there was published the fifth map of Maryland, which was based upon personal observations in the country represented. This appeared in a small pamphlet in 1666. The original tract was a very small volume, the printed matter being 2.1 inches wide by 4.8 inches long. The style of the work was cheap and sometimes vulgar, and the author evidently fully understood the men to whom he was writing glowing accounts of the charms of Maryland scenery and hospitality. So far as can be judged from the inscription on his portrait which was published with this little tract, George Alsop was born in 1638. He evidently was not a very tractable youth, for after two years' apprenticeship to some trade in London he became a source of trouble to his friends, and because of the hearty contempt for Cromwell and his party which he showed in his pamphlet, it is inferred that he was shipped to Maryland to serve a four years' term as a redemptioner. He certainly does not seem to have been a pauper or wanting in money, for he speaks contemptuously of those redemptioners who enslaved themselves in return for their passage money, which amounted to about $30. From the letters which accompany his "Character of Maryland," it is evident that Alsop sailed from Gravesend September 7, 1658, and arrived in Maryland some months later, as the first letter from there is dated January 17 [1659]. He lived in apparent comfort in Baltimore county, and from his roving disposition and easy masters, there is little doubt that he came to know the country of the province fairly well. His chief reputation has been gained from the accuracy and vividness with which he described the "Wilde and Naked Indians (or Susquehanokes) of Mary-land, their Customs, Manners, Absurdities, & Religion."

The map prepared by Alsop (Figure 30) is apparently based on "experimental knowledge of the country, and not from [on]

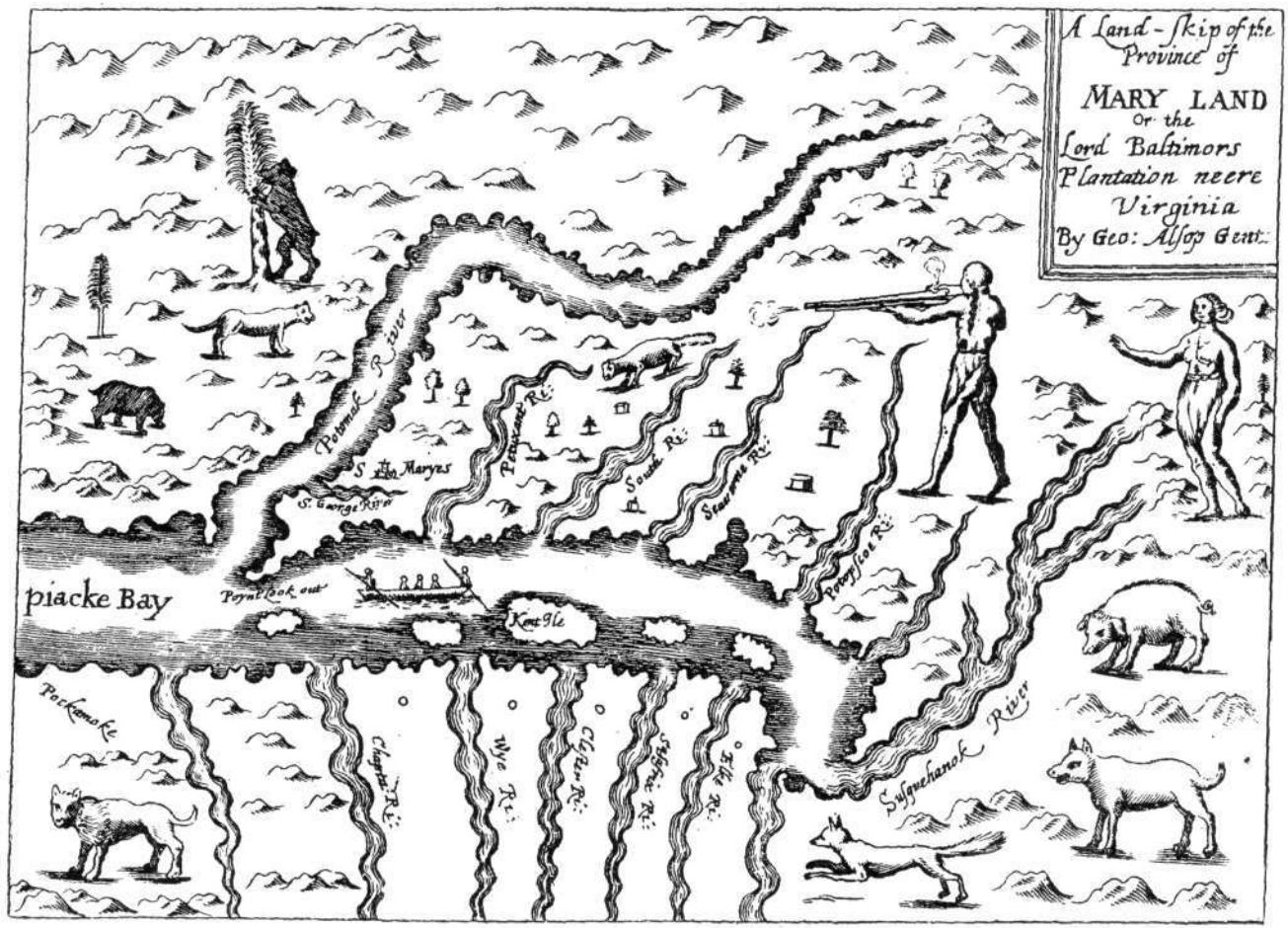


FIG. 30.—Alsop's Map, 1666.

imaginary superstition." In the upper right-hand corner is the title "A Land-skip of the Province of Mary land Or the Lord Baltimors Plantation neere Virginia By Geo: Alsop Gent:" It is probable that he was familiar with a copy of Smith's map, or some work based upon it, for the Chesapeake Bay is named "—piacke Bay." This, however, is not the same in spelling as the Smith map and its position is wholly different. In the same way it does not correspond with the Lord Baltimore map. In fact, it seems to have just the sort of relation to earlier maps that an easy-going fellow would incorporate in a sketch after a sojourn of four or five years in the area. There are about a dozen figures present which indicate the method of illumination and illustration then in vogue. Among these the representations of the male and female savages are of particular interest because of the costumes and manner of dressing the hair, and especially because of the figure of a man in the act of firing a flint-lock musket. The various animals scattered over the little map serve as illustrations to the text in which the author gives a brief account of "the wilde Animals of this Country, which loosely inhabits the Woods in multitudes."[1]

The map shows marked distortion and many generalizations and is in accuracy far below that by Smith. Its rivers are broad and without individuality, while its coast line is roughly represented by a series of sinuous lines bearing no relation to the natural indentations of the bay. The small mountains of the map are not as judiciously placed as by Smith, for, as in the Lord Baltimore map, they are scattered indiscriminately over the Coastal Plain wherever the width between the rivers seemed to call for additional illustration. Both maps represent high land on the right bank of the Patapsco and possibly thereby try to indicate the rapid rise at the "fall line." Although quaint with figures, the value of the map lies in the use of names which have come down to us. There is given here for the first time on a map made by one who had been in Maryland the names of the "Choptank," "Wye," "Chester," "Sasafrix," "Patapsco," "Seauorne" [Severn], and "South" rivers. In the same way "Kent Ile" and "Poynt Look out" appear in their proper

[1] Gowan's Bibliotheca Americana, vol. i [Shea's reprint], p. 38.

places. It is not safe to say that this is the earliest use of these terms on a map, since the names creep in on reissues of old maps. Among those studied by the writer, however, this is the first work based on personal information which uses these terms.

The little "Character of Mary land" in which this map appears was first published in London in 1636 with the following title page: "A Character Of the Province of Mary-Land, Wherein is Described in four distinct Parts, (Viz.)

I. The Scituation, and plenty of the Province.

II. The Laws, Customs, and natural Demeanor of the Inhabitant.

III. The worst and best Vsage of a Mary-Land Servant, opened in view.

IV. The Traffique, and Vendable Commodities of the Countrey, also A small Treatise on the Wilde and Naked INDIANS (or Susquehanokes) of Mary-Land, their Customs, Manners, Absurdities, & Religion. Together with a Collection of Historical LETTERS. By George Alsop. London, Printed by T. J. for Peter Dring, at the sign of the Sun in the Poultrey; 1666."

When Mr. Gowan first attempted to reproduce the work he was unable to find a copy in this country which was entirely satisfactory. The one owned by Mr. Bancroft, the historian, appeared defective in text and deficient in the portrait of the author and also lacking the map. A copy was ultimately found which was complete, and this was edited by J. G. Shea. This reprint by Gowan was published in New York in 1869 as the first volume of Gowan's "Bibliotheca Americana." A later issue of this same work has been brought out as No. 15 of the Maryland Historical Society Fund Publications.

THE HERMAN MAP, 1670.

The map of Virginia constructed by John Smith was the high-water mark in cartographic representation of the territory along the Chesapeake Bay for fully two-thirds of a century. All other maps published between 1612 and 1673 are of much lower standard, or are copied directly from Smith, with perhaps now and then an additional feature or two indicating the gradual growth in the geographic knowledge of the area. In 1670 there was completed within the territory of Maryland a map which is to be ranked with Smith's as representing the highest grade of surveying and drafting conducted in the colonies during the seventeenth century. This map is the one drawn by Augustine Herman, engraved by W. Faithorne in 1673 and copy-

righted in 1674, with the title "Virginia and Maryland As it is Planted and Inhabited this present Year 1670 Surveyed and Exactly Drawne by the Only Labour & Endeavour of Augustin Herrman Bohemiensis". Since this is one of the three maps which have exerted a marked influence on all the cartographic representations of the territory from the founding of the colony in 1634 to the appointment of an official topographical engineer in 1833, it will be of interest to bring together all of the available information concerning the man who made the map and the conditions under which it was prepared.

There seems to be considerable doubt as to the correct spelling of the author's name,[1] and there is some difficulty in choosing the most acceptable spelling. There is also some doubt concerning the place and time of his birth. A copy of his will, which was published by Gilbert Cope in the Pennsylvania Magazine of History,[2] contains the statement that this document is dated September 27, 1684, and under Herman's name appears in the same handwriting "Aetatis 63." According to this, Herman seems to have regarded the date of his birth as 1621, a date which would make many of his achievements the products of boyish bravado and enthusiasm. From our present-day standpoint, Herman in 1649-1650 would be regarded as too young to be entrusted with important missions, but at the beginning of the seventeenth century, as shown by the deeds of Smith before he reached his majority, such activity in very young men did not seem abnormal or exceptionally precocious. The

[1] According to the different documents the name is variously spelled:
Augustine Herrman (Map and autograph).
Augustine Hermans (Johnston, History Cecil Co., p. 35).
Augustyn Heermans (Doc. Hist. N. Y., vol. i, p. 430; His journal).
Augustin Herman (Doc. His. N. Y., vol. i, p. 469).
Augustine Heemans (ibid., vol. ii, pp. 80, 84).
Augustyn Hermans (Ibid., p. 98).
Augustine Herman (Md. Archives, vol. xv, p. 18).
Harman (Mem. Long Island Hist. Soc., vol. i, 1867, p. 230).
Augustine Herrmann (Dictionary Nat. Biography).
Augustine Hermen (Doc. His. N. Y.).
Augustyn Herrman (The Will, see Penn. Mag. Hist., vol. xv, p. 326).

[2] Vol. xv, pp. 321-326.

other view that Herman was born in 1605 or 1608 seems to be more commonly held, perhaps from the fact that this copy of the will is little known. According to James,[1] there are two theories regarding Herman's birthplace. The view that he was born at Prague is better established than the assumption that he was born in some town in Germany. We find it definitely stated in a memorandum signed by Herman on June 13, 1681, that he is a Bohemian,[2] while in making his petition for naturalization papers on September 17, 1663, we find the assertion that[3] he was *from* Prague. Nothing is known regarding his early schooling or training, but it seems quite probable from the handwriting and phraseology of his will, as well as from the accuracy of his map, that he acquired an education rather above that usual for his time. From various sources it is learned that "as early as the year 1633 he had been employed by the West India Company, and in its services had made voyages to Holland and elsewhere. Afterward he was engaged in commercial enterprises, not always of a peaceful character, for he is mentioned as having been engaged in privateering, to which, in that day, no odium attached."[4] He first settled in New Amsterdam "on or before 1647,[5] in which year he was appointed by the Director and Council at New Netherland one of the "Nine Men, a body of citizens selected to assist the government by their counsel and advice." It is certain that he went out to New Amsterdam in the Maecht van Enchuysen as a clerk or factor to John and Charles Gabry of Amsterdam.[6] While in New Amsterdam Herman became a very prominent man in the affairs of the colony and had much to do with the government under Peter Stuyvesant during the years 1649-1650 [O. S.]. His name appears as a "Sellectman" of the town, and in April, 1651, he was sent to Rhode Island as a special ambassador bearing a letter from Governor Baxter to Governor Coddington of the latter colony. Since this letter

[1] James, in his dissertation on the Labadists, asserts that such a will was never recorded although we know that a record of the will was stolen from the State papers.

[2] Md. Hist. Fund. Pub., No. 3 App., p. 29.

[3] Archives of Maryland, vol. i, p. 462.

[4] Ward, Penn. Mag. Hist., vol. vi, p. 88.

[5] Mem. Long Island Hist. Soc., vol. i, p. 230.

[6] N. Y. Doc. Hist. N. Y., vol. i, p. 431.

seemed to show treason against the colonies of New England and of Rhode Island particularly, Herman and his companion, Adrien Keysey, were compelled "to give bail in the sum of 100 lbs. stirling till their innocence should be proved." They finally received a certificate from their superiors certifying that as bearers of the letter they were ignorant of its contents and entitled to their freedom.

Although occupying a prominent position under the administration of Stuyvesant, Herman's lot was not always a happy one, for we find that his business affairs at times were not in the best of order. In 1669 petitions were presented "to their High Mightinesses in the name and on the behalf of John and Charles Gabry, merchants at Amsterdam, praying that their High Mightinesses' favorable letters and recommendation to Petrus Stuyvesant, Director General in New Netherlands, to lend a helping hand to the Petitioners or their attorneys, that they may receive from Augustin Herman, their factor in those parts, due account, proof and remainder of the goods which he hath had to dispose of from the Petitioners and their co-partners." About this same time also, Herman writes a wailing letter complaining that everything is going to the bad in the new country and that he fears he is liable to arrest because he will not sign "that he knows and can say nothing of Director Stuyvesant but what is honest and honourable."[1]

Either as a debtor or as a political prisoner it seems that Herman suffered an arrest and incarceration—incidents giving color to one of the most interesting of the many traditions centering about his name. According to one story, "Herman returned to New York, some time after his settlement in Maryland, to find his estate in this city seized by a squatter, and when Herman protested, he was himself placed under arrest. He feigned insanity, the story goes, and refused to be parted from the horse which he had ridden all the way from Bohemia Manor. Accordingly he was bidden to ride his own horse to the second story of a stone warehouse, where he and the horse were securely locked in. But when all his enemies had departed, Herman mounted his horse and rode straight at the closed window of his prison. Horse and man went through the window and

[1] Doc. Hist. N. Y., vol. i, p. 453.

landed safe on the stones below, but with such force that blood gushed from the nostrils of the horse. The escaping prisoner then rode straight to the Hudson, swam his horse to the Jersey shore, and in due time arrived at Bohemia Manor, having in the course of his journey swum also the Delaware on the back of his horse. One legend is that the animal died soon after this second feat; the other, that he carried his master straight to the manor house. . . . At any rate, there are two or three pictures extant of Herman and his horse, the master being represented as standing beside the horse with the blood of the faithful creature reddening his hands. It is pretty well authenticated that Herman himself caused at least one of these pictures to be painted." According to the account of Lednum,[1] one of the halls of the mansion was lined with old and valuable paintings, which had belonged to Augustine Herman himself. Among them were his likeness and that of his lady, together with the painting representing his flight from New York. These were destroyed by fire in 1815.

Herman's first acquaintance with Maryland came about through the aggressiveness of the Council, who ordered that Col. Nathaniel Utie "do make his repaire to the pretended Governor of the people seated in Deleware Bay, within his Lordship's Province, and that he do give them to understand that they are seated within this, his Lordship's Province without notice given to his Lordship's Lieutenant *here*, and do require them to depart this Province."

The Dutch were very badly frightened by Utie's behavior, and immediately sent messengers overland to Manhattan to inform Stuyvesant of the demands he had made. Fearing that the messengers might meet with some disaster, the next day they dispatched a vessel for the same purpose. Governor Stuyvesant, upon being informed of the condition of affairs on the Delaware, dispatched Augustine Hermen and Resolved (or Rosevelt) Waldron upon a mission to Maryland for the purpose of adjusting the difficulty. They came by way of New Amstel and left there on the 13th of September, 1659.

A journal which they kept has been preserved in the Albany Records, 18th volume, pp. 337-364; in the Documentary History of

[1] Methodism in America, p. 277.

New York, vol. II, pp. 88-98, and republished in abstract in Scharf's History of Maryland, vol. I, pp. 244-249. This gives an account of their journeyings down the bay from South Point near Elkton to Kent Island on the eastern shore and thence across the bay and down to St. Mary's. Their experiences in a leaky boat as ambassadors to a somewhat unfriendly people were quite arduous as well as dangerous. Herman was the ambassador and Waldron served simply as an interpreter. That the former was well fitted for his work as a diplomatist is evident from the fact that he was the first one to emphasize the weakness in Lord Baltimore's charter through which it was impossible for the Calverts to embrace any territory which was inhabited by Europeans at the time the charter was granted. After negotiating with the Governor of Maryland, Augustine Herman set out for Virginia, October 21/11 in order to gain the good-will of the authorities of the latter so that they would either take the part of the Dutch or at least not aid the Marylanders. Before leaving St. Mary's Herman wrote a letter to Stuyvesant, which is of considerable interest, as showing that his first plan was to make a map of the head of the bay which should be an accurate basis on which to base a treaty between the colonists at New Amsterdam and those on the Chesapeake. This letter closes with the following paragraph: "But, first of all, the South river [Delaware] and the Virginias, with the lands and kills between both, ought to be laid down on an exact scale as to longitude and latitude, in a perfect map, that the extent of country on both sides may be correctly seen, and the work afterwards proceeded with, for some maps which the English have here are utterly imperfect and prejudicial to us. The sooner this is done, the better, before Baltamoor whispers in the ears of the States of England and thus makes the matter much more difficult."

From the above quotation it is evident, perhaps, for the first time, that Herman first offered to make a map of Maryland territory in the interests of the inhabitants of New Amsterdam. Stuyvesant probably felt that this was looking out in too great detail for the affairs of a poor little colony down on the Delaware and evidently let the proposition go by unnoticed.

Herman remained in Virginia some time, for the authorities at New Amsterdam, when dispatching Captain Newton and Barlette to Maryland on a mission in February, 1660, instructed them to inquire in Maryland if danger threatened the South river and to avail themselves of the "aid and tongue of Augustine Hermann." [1]

On his way to and from Virginia, Herman passed through that portion of Maryland which he subsequently named Cecil county. This area, together with the fact that his suggestion concerning the preparation of a detailed map for Stuyvesant was neglected, led Herman to offer to make a map of Lord Baltimore's territory in return for a manor along the Bohemia river. This offer was accepted by Lord Baltimore in 1660, and as soon as the letter of denization was granted to Herman and his family he moved his whole establishment down to the site of the present Bohemia Manor. During the following decade Herman was busy with the preparation of his map and the clearing of the lands about his new home. His own native ability and the wide acquaintance gained in his business as a surveyor soon brought him into considerable prominence, and we find him a Justice of Baltimore county, a Commissioner with Jacob Young to treat with the Indians,[2] and empowered to grant passes [3] to traders in the area. He was also on exceptionally good terms with the authorities of Delaware, for we find that a road was built at the latter's expense from Newcastle half-way to his manor, while Maryland built the other half. His home was a favorite resort for the higher officials of Maryland, and Charles Lord Baltimore is said to have spent much of his time at Bohemia Manor.

In 1650 [5] Augustine Herman married a daughter of Nicholas Varleth, one of the richest merchants of New Amsterdam. By this marriage there were two sons and three daughters, who were brought to Maryland with Herman in 1660. The father was apparently the only strong man of the family, for his children seem to have been weak, not altogether attractive, and the source of little comfort to

[1] Johnston, History of Cecil Co., p. 35.
[2] The Commission may be found in Johnston's History of Cecil Co., p. 79.
[3] Archives of Maryland, vol. i, p. 193.
[4] Slaughter, Memoir of Col. Joshua Fry. [5] Johnston (p. 36) says 1651.

Herman in his old age. Herman's second marriage was to Miss Catherine Ward of Cecil county in the year 1666. There is a rumor, which has come down to us, that this second marriage was a source of great trouble to the old man, and that domestic affairs finally became so strained that none of the children could live with their stepmother. Certain it is that little attention was paid to the second wife in Herman's will. It is now generally accepted that Herman's death occurred in 1686, as his will, which was written two years earlier, was recorded at that time. The original record was torn from the colonial files, and Herman's son-in-law, Mr. Vanderleaden, was compelled to ask that a new copy be recorded in order that his wife might not be disturbed in the possession of her property.[1] A phototype of a parchment copy with the names of witnesses cut off was published by Gilbert Cope[2] in 1891. From the preceding narration of some of the many facts which have come down to us it is evident that Herman was a man of exceptional power and acumen. He was skilled in diplomacy, polished in speech and pleasing in his personality. As a surveyor and artist he seems to have been far above the average, as is evidenced by his sketch[3] of New Amsterdam, which was engraved on Nicholas Jan Visscher's map, "Novi Belgii Novaeque Angliae nec non partes Virginiae,"[4] published in 1650-56, and also by one on a reduced scale from Visscher's map, which was prefixed to the second edition of Vanderdonck's "Description of New Netherland." Not only was Herman a good diplomatist and surveyor, but he was also a man of affairs who became prominent in local politics and in the promotion of ambitious enterprises for the internal improvement of the country.[5]

The thought of preparing a map of Maryland, as already shown, came to Herman's mind when, as an ambassador to Governor Fen-

[1] Archives of Md., vol. xii, 1894, p. 418.

[2] Penn. Mag. Hist., vol. xv, pp. 321-326.

[3] Wilson, J. G., in "A Maryland Manor," Md. Hist. Soc. Fund Pub. No. 30, p. 10.

[4] This map is of especial interest because of its use in defining the territory granted to Wm. Penn. See portion relating to Boundary Controversies.

[5] He is supposed to have chosen his site for a home with an eye to the construction of a canal connecting the Delaware and Chesapeake bays.

dall, he suggested to Stuyvesant the great advantage of having the territory under dispute accurately represented on some plat or drawing. So firmly was he imbued with this idea, that when Stuyvesant failed to accept the suggestion, Herman proposed to make a map in the interests of Lord Baltimore. The difficulties which Herman undertook to overcome in making this map of Maryland may be better appreciated when it is realized that ordinary roads at this time "were only spaces or paths cleared of trees, and often so narrow and obscure that it was very difficult to follow them." It was not until 1704 that it was enacted that the public roads should be cleared and grubbed at least twenty feet wide, and that overseers should be appointed to keep them in repair and erect bridges over heads of rivers, creeks, branches and swamps where they were required. This act also directed that all roads leading to the court houses in the several counties should be marked "by two notches cut in the trees on both sides of the roads aforesaid, and another notch a distance above the other two. . . . Roads leading to a church were to be marked at the entrance into the same; and at the leaving of any other road with a slip cut down the face of the tree, near the ground. Roads leading to a ferry were to be marked with three notches. When roads ran through old fields they were to be marked by stakes discernible from each other, and notched like the trees."[1]

According to Herman's account, he was employed in the preparation of his map of the area for nearly ten years and spent about £200 sterling, a large sum of money at that early period, and equivalent at the present time to at least $10,000. The expenditure of so much money seemed to be necessary on account of the degree of accuracy which was expected by Lord Baltimore and enjoined in the following extract from papers sent to the Council of the colony, December 13, 1761:[2]

"Whereas Mr. Augustine Herman now Resident in or sd Province has (as wee are well informed and satisfyed) taken great paines and Care in order to the Draweing and Composeing of a certeine Mapp or Card of our said Province & of the Limits and boundaryes of the same, And is shortly

[1] Johnston, History of Cecil County, p. 79.
[2] Archives of Md., vol. xv, p. 18-19.

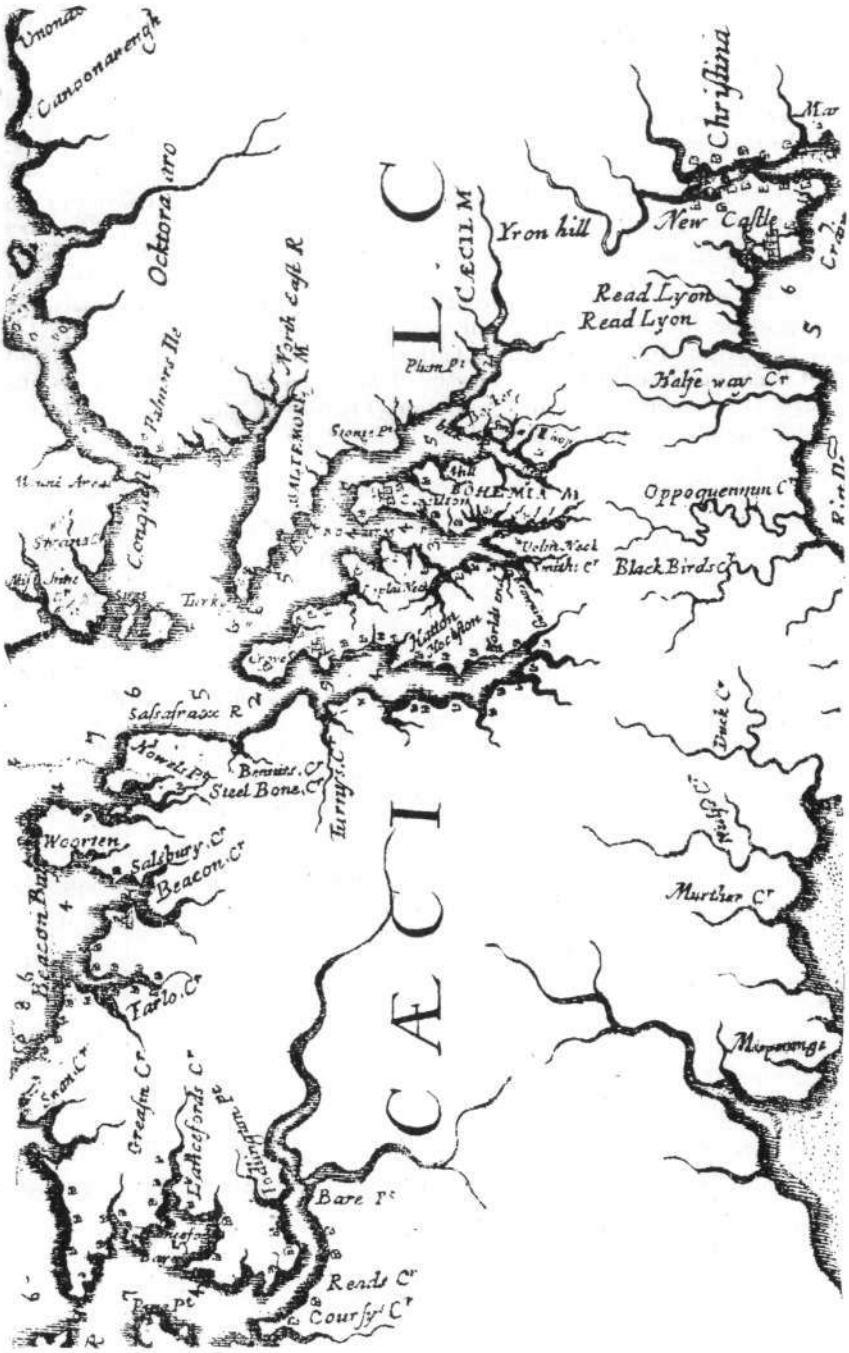


FIG. 31.—Portion of Herman's Map, 1670. Original Scale.

intended to print and publish the same, wee Doe will and Require you that after the said Map or Card shalbe printed and published, and in case upon the strict perusall and Examination of the same you shall finde that the said Herman has done us Right in stateing the said Limits and boundaryes of our said Province Justly and truly and pticulerly in the True stateing of the said boundaryes and Limits in relation to Watkins Pointe and Delaware Bay that in such Case you recommend the said Herman heartily and Effectually in our name to the Generall Assembly of our said Province than next after to be called or summoned in order to the Receiving some Reward from them for his Paynes and Care, and that in the meane time you assure the said Herman in our name that in case he doe us Right as aforesayd upon the first notice to us thereof Given from you our said Leivetennant Generall or you our said Councill wee will give Directions and orders for his imediate naturalization as he hath desired of us. Given under or hand and Seale at armes the sixteenth day of ffebruary in the four & Thirtieth yeare of our Dominion over our said Province. Annoque Domini One Thowsand six hundred sixty five."

That the map satisfied the demands and desires of Lord Baltimore is seen in the following extract from a summary statement relating to Bohemia Manor which was apparently drawn up by Augustine Herman:

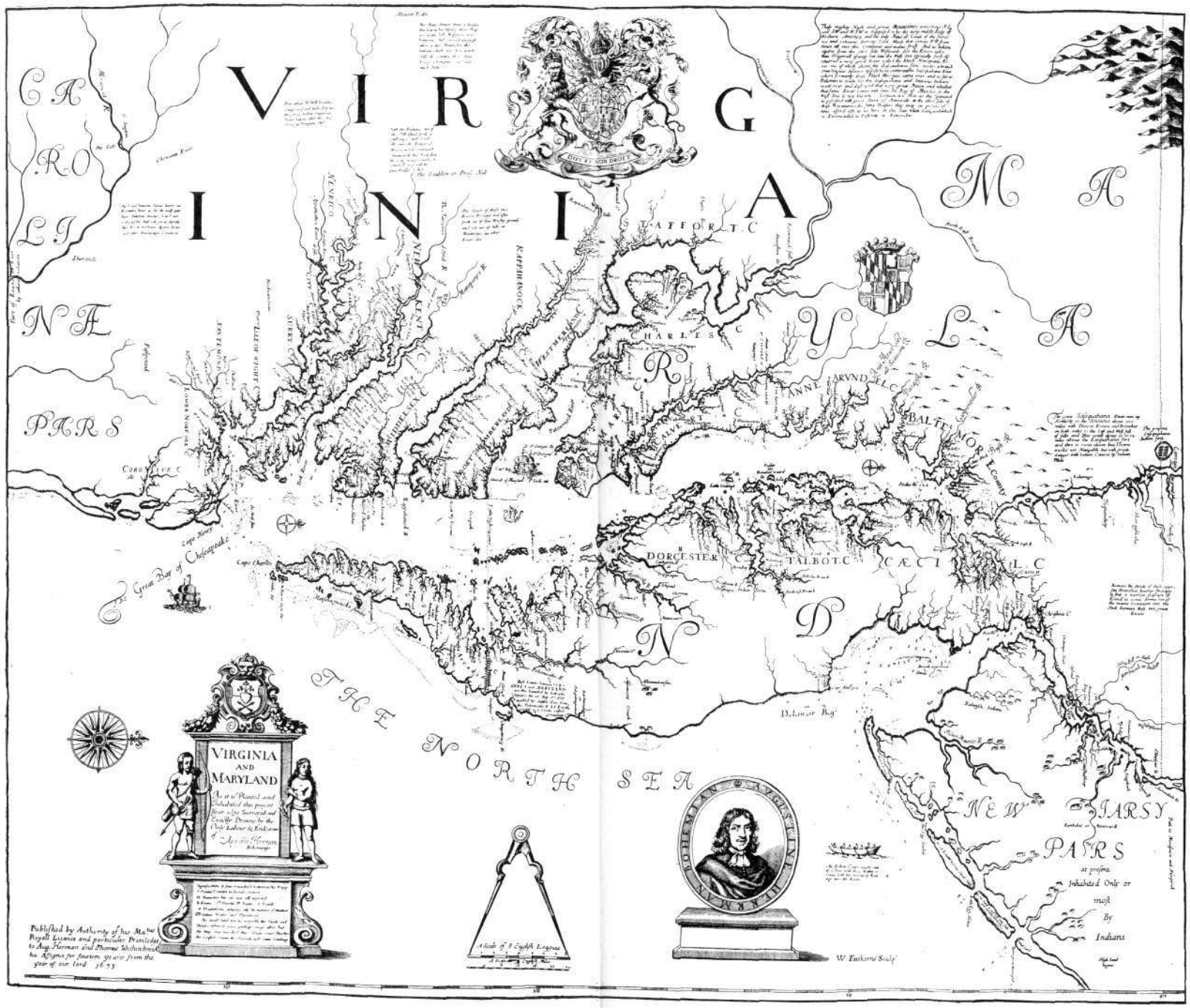
"Augustine Herman haveing his Mapp finished upon his own Cost and Charge no loss than to the value of about 200 pounds Sterling besides his own Labour and Sent into England, he then Informed his Lordship there, that within the Naturall bounds of his Mannor were more Acres found to bee; then in his Pattents Specified & therefore Requesteth that it might be Amplifyed and added in his said Pattents whereupon his Lordship Replyed by Lettr Sepr. 3rd & Novr 12 That his Lordship had Received no small Satisfaction by the Rarity of that Mapp and the Kings Majasty his Royl Highness and all others Commended the Exactness of the work.

Aplauding it to be the best mapp, that was Ever Drawn of any Country whatsoever, with recommendation to the Press, his Lordship assuring further that his son then comming Over Governor again should not deny the additionall Amplification Desired nor anything Els whatsoever in Reason should be Expected."[1]

Stuyvesant endeavored to obtain possession of this valuable map, and later Washington remarked that "it was admirably planned and equally well executed."[2]

The grant for exclusive publication of this map may be found in the Calendar of State Papers, Colonial America and West Indies, 1669-1674, page 551, and is here inserted:

[1] Wilson, loc. cit., p. 32. [2] Wilson, op. cit., p. 13.



HERMAN'S MAP OF VIRGINIA AND MARYLAND, 1670 (REDUCED).

Jany 21. 1674.

Whitehall.

1210. Grant to Augustine Hermann of the privilege of the sole printing of his map of Virginia and Maryland. Whereas he has by the King's command been for several years past engaged in making a Survey of his Majesty's countries of Virginia and Maryland, and hath made a map of the Same, consisting of four Sheets of paper, with all the rivers, creeks and Soundings, etc., being the work of very great pains and charge, and for the King's especial service; and whereas the copying or counterfeiting of said map would be very much to said Herman's prejudice and discouragement, all his Majesty's Subjects are hereby Strictly forbidden to copy, epitomize, or reprint, in whole or in part, any part of said map, within the term of fourteen years next ensuing without the consent of said Herman, his heirs, or assigns. [Dom. Entry Bk., Chas. II, vol. xxxvi, pp. 323, 324.] [1]

The map under discussion, of which only one copy is known to exist (now in the Grenville Library of the British Museum), was originally printed in four sheets, which, when put together, measured 36 by 31 inches. The two plates accompanying this report indicate the general appearance of the map on a greatly reduced size, and a portion of the same on its true scale representing the region about the head of the bay. This indicates the most detailed portion of the work, for it includes the territory adjacent to Bohemia Manor, Herman's home. Mr. Phillips, Custodian of Maps in the Library of Congress, possesses a photograph of this exceedingly rare map on its original scale, and there is a facsimile made from the original copy which was published among the "Maps accompanying the report of the Commissioners on the boundary line between Virginia and Maryland, Richmond, 1783." The following description is based upon a study of the facsimile photograph and the reduced copy: [2]

In the center above are the royal arms of Great Britain. Toward the right below is a portrait on a pedestal of Augustine Herman, with an inscription telling some of the features of the map, while at one side is a legend explaining some of the symbols employed. Some-

[1] Quoted by Phillips, op. cit., p. 36-37.

[2] A copy differing in minor details from either of the foregoing is in the possession of Richard Bayard, Esq., of Baltimore, present owner of the Bohemia Manor estate. The two plates here given are taken from this copy, which was generously loaned for the purpose.

what below and to the right of the British coat-of-arms is a smaller shield representing the insignia of the Baltimores. In various places on the map are short accounts elucidating or expanding some of the features suggested in the drawing, as, for example, the comment on the southern boundary on the eastern shore which says:

"These Limits between VIRGINIA and MARYLAND are thus bounded by both sides Deputies the 27 May A° 1668 Marked by dubble Trees from this Pokomoake EAST to the Seaside to a Creeke called Swansecut Cr."

The delineation of the map is good. The names are distinct, and in almost all instances may be read with comparative ease. The map shows evidences of great care in execution, although Herman criticised it, remarking that it "is slobbered over by the engraver Faithorne, defiling the prints with many errors." The full title is as follows: "Virginia and Maryland As it is Planted and Inhabited this present Year 1670 Surveyed and Exactly Drawne by the Only Labour & Endeavour of Augustin Herrman Bohemiensis. Published by Authority of His Maties Royall Licence and particular Priviledge of Aug. Herman and Thomas Withinbrook his Assignee for fourteen yeares from the year of our lord 1673 W. Faithorne Sculpt."

The amount of area included in the drawing extends from the fortieth degree of north latitude to some point in North Carolina, and westward to an irregular line in the longitude of Washington and the Great Falls of the Potomac. Over the area which is now part of Maryland there are eight county names, but no boundaries are laid down between the divisions. These are St. Mary's, Calvert, Charles, including Prince George's, Anne Arundel, and Baltimore, the last two including the present Howard, Carroll, and Harford. On the eastern shore are Cecil, including Kent; Talbot, including Caroline and Queen Anne; and Dorchester, including Worcester, Wicomico, and Somerset. A detailed study of the features of the Herman map leads to the following conclusions:

The lower neck of the eastern shore below the Maryland-Virginia boundary is too narrow and the sounds on the eastern side are too broad. If, however, the delineation is good there has been a marked

amount of sedimentation along the shore since Herman's time. On the other hand, Chincoteague is represented as about five miles long, instead of nine as at present. The rest of the shore is generalized, and no islands or bays are given, and it seems probable that Herman never studied this portion of the coast. "Cedar Ile" may mean either Mills Island or Middlemoor Island.

A study of the shores of Somerset county seems to indicate that considerable filling in has taken place since the date of the map. The estuaries of Morumesco creek and Fisher creek are represented as large bays, the latter with not over three or four feet of water. Portions of the coast, such as James Island Marsh, Hazard Point and Deal's Island, and possibly Nanticoke Point, are represented by Herman as islands clearly separated from the mainland, while Holland, South Marsh and Smith's Islands are delineated as small archipelagoes. The outlines of the rivers are better than those by Smith, although sometimes, as in the case of the Nanticoke, the expression of the curves is not as sympathetic as in the earlier map.

The coast line of Dorchester county is very greatly improved over that of any pre-existing map. The country seems to be so well delineated that one is justified in making some comparison with the present state of the land. The most interesting deviation is in the representation of Griffiths Neck between the Nanticoke and the Transquaking. The shore line is here much farther north, and the Chicacomico does not empty into the "St. Catherine als Trequagin" river, but seems to flow directly into the bay. The mouths of the two streams are separated by "Philips Point," which is the only evidence of the headland now terminating at Clay Island. The drawing of Bishop's Head just to the westward indicates a similar change, since the bay extends farther north, and much of the present Bishop's Head Neck was shallow water or marsh and an archipelago of islands. The whole western coast of Dorchester presents the same conditions. It is skirted by a series of islands, and the small streams empty directly into the bay. The neck between the Little Choptank and the Choptank is particularly well outlined, and the map shows the usage of many terms now appended to the same points. The

spellings are frequently different, as Tobacco Stick is called "Tobaco Sicks," and Choptank is written "Chaptanck."

As the territory delineated approaches Herman's home, Bohemia Manor, the details increase, until in the territory between the Sassafras and the North East they become so many that the map darkens, and the names, though few, are not very distinct. The description of the country between the Delaware and the Susquehanna is increased by the following information: "Between the Heads of these opposite Branches beeing Swampy is but a narrow passage of Land to come downe out of the maine Continent into the Neck between these two great Rivers."

The names along the Susquehanna located within the present limits of the state are Octora-aro [Octorara] and Canoeawengh [Conowingo]. The northern bounds of the colony extending to 40 north latitude and the Susquehanna, which is more carefully sketched than in previous maps, is represented beyond "the Fort" [opposite Columbia], and this additional information is given: "The great Sassquahana River runs up Northerly to the Sinnicus [Harrisburg?] above 200 miles with Divers Rivers and Branches on both sides to the East and West full of falls and Iles until about 10 or 12 miles aboue the Sasquahana fort and then runs cleare but Downwards not Navigable but with great danger with Indian Canoos by Indian Pilots."

The coast line between the head of the bay and the Patapsco shows considerable detail, especially about the mouth of the Gunpowder, but that portion of the map intended to represent the area between Back and Middle rivers is poorly drawn and more or less widely generalized. The Patapsco is not as well outlined as in the Smith map, although there is more detail along the shore south and east of the present site of Baltimore. Following the coast below Bodkin Point, the representation is good as far as the mouth of the Magothy river [unnamed], where for some reason Gibson's Island is not represented either as a point or an island. Sandy and Greenbury Points, with intervening inlets, are indicated somewhat generalized with distorted shape and trend. The "Ann Arundel als Seavorn R." is too broad, but its general trend is well shown as far as Round Bay, above

which the outline is generalized, with the headwaters following gracefully curving courses. On the south bank of the river at the present site of Annapolis is "Arundelton." Between Annapolis and Cove Point the amount of detail shown is an advance over that given in preceding maps, especially about South and West rivers, although these show the constant error of being too broad. This, however, is a feature which is common to the rivers of this and many other maps of the seventeenth and eighteenth centuries.

The drawing of the Patuxent, which evidently was explored as far as Upper Marlboro, is good, but is not a great improvement over that of the Baltimore and Smith maps, which represent the general course of the stream even more accurately in some of the prominent details, such as the sinuosities east of Charlotte Hall.

The small streams, especially on the west bank, seem to have confused Herman, since they become generalized and placed at more regular intervals with conventional courses. The largest side stream, named "Calvert Cr," has not been identified satisfactorily. It seems probable that a large estuary seen while skirting along the shore was mistaken for the mouth of a large stream and so interpreted.

The shore line all along the Rappahannock and York and James rivers seems to have been drawn with detail equal to that of the Maryland portion, and the names of creeks and places are especially abundant along the last two rivers. It is not known that Herman spent much time in studying this part of the country, but there is an increase in local names and details over preceding maps which indicates that he was tolerably familiar with the area. The remark on the map that a part of the "Roanoke" river is "by others relation," implies that the rest of the map is based on personal observations. The weakest portion of the entire work is the drawing of the Potomac above Maryland Point. Between the latter spot and the present site of Washington the curves are broad and generalized, the necks of land are unevenly emphasized or distorted, and some of the streams flow at an angle to their true courses and empty into the Potomac some distance from their present mouths. These differ-

ences are not due to changes in the topography so much as to ignorance of the country represented. Below Maryland Point the Potomac shore line is more accurate in its delineation, but the various bays and points are, in the majority of instances, without names, and often they cannot be identified with the features recognized to-day.

In the upper right-hand corner of the map, besides a group of mountains which may represent either the Blue Ridge or the Alleghanies, is the following explanatory note: "These mighty High and great Mountaines trenching N:E and S:W and WSW. is Supposed to be the very middle Ridg of Northern America and the only Naturall Cause of the fiercenes and extreame Stormy Cold Winds that comes N:W from thence all over this Continent and makes frost. And as Indians reports from the other side Westwards doe the Rivers take their Origin all issuing out into the West Sea especially first discouered a very great river called the Black Mincquaas River [?] out of which aboue the Sassquahana fort [opposite Columbia] meetes a branch Some leagues distance opposit to one another out of the Sassquahana River where formerly those Black Mincquas came over and as far as Delaware to trade but the Sassquahana and Sinnicus Indians went over and destroyed that very great Nation and whether that same River comes out into the Bay of Mexico or the West Sea is not known. Certain it is that as the Spaniard is possessed with great Store of Minneralls at the other side of these Mountains the same Treasure they may in proces of time afford also to us here on this Side when Occupyed which is Recommended to Posterity to Remember."

The first copy of the map, as already indicated, was engraved by Faithorne who was at the time distinguished for his crayon portraits and his delicate copper-plate engraving. It is not known that more than one edition was taken from this plate, and it seems probable that very few impressions were made, since at the present day only one copy, that in the Grenville Library of the British Museum, is known to be extant. Even before the lapse of the copyright, this map, with various changes and omissions, was republished in 1676 under the title of "a map of Virginia and Maryland sold by Thomas Basset and

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ELK AND BOHEMIA RIVERS, FROM ELK NECK.

AT THE HEAD OF CHESAPEAKE BAY.

Richard Chiswell. T. Lamb Sculpt." in Speed's "Prospect of the most famous Parts of the World."[1]

Somewhat later the map entitled "Virginia, Maryland, Pennsilvania, East & West Jarsey," by John Thornton and Will Fisher, was based primarily on the Herman map. In 1708 a reduced copy of Herman's map was published to illustrate Oldmixon's "British Empire in America," and the credit was given to Herman Moll. The same cartographer used the drawing of Herman in the preparation of maps for many subsequent volumes, notably the "Atlas Geographus" in 1717 and "Atlas Minor" in 1736. Even Homann, as late as 1759, published the Moll map found in Oldmixon's "British Empire" in his "Atlas Geographicus Maior." About the same time John Senex, another noted map publisher, used the Herman map in modified form in his "A New General Atlas," published in 1721, while in 1747 Eman. Bowen claims to furnish "a new and accurate map of Virginia & Maryland. Laid down from surveys and regulated on Astron'l Observat'ns," which Philips says is from Herman's map. Copies from this plate were republished in 1752.

The various editions of the English Pilot contain maps of the lower Chesapeake Bay, which are thought by Philips to be based upon the Herman map. They may, however, be compilations from the Smith and Hoxton charts. From the middle of the eighteenth century until after the Civil War the American map seems to have been lost sight of, and it was only during the careful searches conducted by the Virginia Commissioners on the Southern Boundary question that it was learned that a copy of the Herman map was still extant. A photograph from this rare map was reproduced in a report of the Virginia Commission in 1873, but even this report is now quite rare, and the appearance of the Herman map is practically unknown to the inhabitants of Maryland.

When compared with its predecessors, the map shows a marked increase in detail and evidence of much greater time and labor spent in its preparation. Compared with the Smith map, it shows that while Herman was a more skillful draftsman and a better surveyor,

[1] Philips, p. 42.

he did not possess the geographic sense shown by Smith in the preparation of his map. Although Herman spent ten years in a study of the area, and Smith scarcely as many weeks, the latter showed a clearer grasp of the salient differences between the topography of the Coastal Plain and the Piedmont Plateau than did the former. Smith not only recognized the differences in the character of the eastern and western shores, but seemed to be impressed with the distribution of the irregularities in the territory which he represented. Herman, however, distributed his mountainous area more diagrammatically and conventionally, and did not seem to attempt to give a sympathetic interpretation of the many features which he must have observed. It is of course possible that these slight features in the drawings are among those referred to by Herman in his criticisms of his engraver. The influence of Herman on later works seems to have been about equal to that of Smith, since in the minds of the prominent map and atlas publishers of the last of the seventeenth and the first of the eighteenth centuries, these two men stand as the chief authorities for the cartographic representation of the territory on either side of the Chesapeake Bay.

HOXTON'S MAP OF THE CHESAPEAKE, 1735.

No large map of the Chesapeake shores was published as the result of additional surveys after the appearance of Herman's map until 1735. At that time Walter Hoxton, who seems to have been a captain in the merchant service between London and Virginia, issued his draft entitled "To the Merchants of London Trading to Virginia and Maryland This Mapp of the Bay of Chesepeack, with the Rivers Potomack, Potapsco North East and part of Chester, Is humbly Dedicated & Presented, by Walter Hoxton. 1735." The only information which we have regarding the preparation of this map is incorporated as text upon it. The fullest statement is as follows: "In this Draught all the Principal Points, and all the Shoals and Soundings are Exactly Laid Down, but as I have not had Oppertunity to Survey all of ye Bays, Rivers and Creeks, I have distinguisht what is my own doing by a Shading within the Line, from the outer part of

the Coast which to make this Map as complete as at present I am able, have borrow'd from the Old Map, & are Traced by a Single Line without Shading. N. B. The Depths of Water are set down in Fathoms as farr up as Spes Utie Island, but above that in Feet." A study of the map and of the areas shaded as above described shows that the author claimed that he traced the principal portions of the shore line from Cape Henry to "Newport Neues" and Back River (Virginia). From the latter point to the mouth of the Potomac are only a few details regarding the promontories. Both shores of the Potomac are shown from its mouth to the Great Falls, and the names of the tributary creeks are given, although few are indicated farther than their mouths. Along the main shores of the bay, beginning at Point Lookout, the points and portions of the inlet are given as far as North East and thence southward along the Eastern Shore as far as Sharp's Island. The author states at this point that the "Coast from Craddich to Hoopers Streights (on Eastern Side of the Bay) I have not yet Survey'd." The shores of the Patapsco are given with especial detail as far as the Elkridge Landing. The waters of the bay, as already indicated in the quoted text, are covered with figures denoting the depth of the channel in the various portions of the bay.

The sheet on which the map is drawn is 56 by 37 inches in size and the scale is approximately five miles to the inch. In the lower right-hand corner are the statements "Price Eight Shillings & Six pence pasted on Cloth," "London Printed for the Author and Sold by W. Betts at the Virginia and Maryland Coffee house near the Royal Exchange, and E. Baldwin at Ratcliff Cross.

Certain peculiarities regarding the spelling of names and the sketching of the natural features are of interest. Tangier is spelled "Tangere" and Magothy river is spelled "Maggoty." Kent's Island is separated from the mainland by "Wading Place Ferry," and Holland Island from Holland Point by a small estuary.

In the southeast corner of the map is a large sketch of Herring Bay 21¼ by 22 inches in size which was drawn in 1732. On this are set down the depth of the water in feet, the houses, the sailing direc-

tions and other features of interest. The scale used is two miles to the inch.

Advance beyond the Blue Ridge.

Prior to the fourth decade of the eighteenth century, little information concerning the country west of the Blue Ridge had been gained, and the representations found on the maps published before that time are all vague and fanciful. The attempts of cartographers had been limited to an elaboration of the details in the shore line of the Chesapeake Bay and of the Potomac. After the energy displayed by Lord Fairfax in placing settlers on his lands west of the Shenandoah valley the colonists in Maryland began to push farther westward, and with this movement of the population came an increase in the knowledge of the natural features of that portion of the state now included in Washington, Allegany and Garrett counties. Most of the information gathered was brought together by Virginians or Pennsylvanians, since, with the exception of a crude sketch by Cresap, the work of Marylanders is limited to the tidewater portion of the province.

The "Mayo" map, 1736-7.

During his exile, Charles II granted to several of his fugitive friends a tract of land in Virginia between the Rappahannock and Potomac rivers. Little by little the property passed into the possession of fewer holders, until in the year 1688 the whole title had vested in Thomas, Lord Culpeper, from whom this property came later into the possession of his son-in-law, Lord Fairfax, who petitioned the King in 1733 for a survey and determination of the limits of his territory. The petition was granted and six commissioners were allowed, three representing Virginia and three the Crown. Three years later, in September, 1736, the Commissioners met and appointed Messrs. Wm. Mayo, Robert Brook, —— Winslow, and —— Savage as surveyors "to examine the main branch of the Potowmack river called Cohungoruton to the head spring thereof." "These being all first sworn, were order'd by thier Several Warrants to begin at the Confluence of that River with Sharando and from thence to run the Courses, and Measure the Distances thereof to its

first Spring; And of all this to return an Exact Plat, shewing all the Streams runing into the same on either side, together with a fair Copy of their Feild-Notes. We also directed them to take the Latitude, and observe particularly where the said River intersects the 40th Degree."

Surveyors were also appointed to examine and survey both branches of the Rappahannock to their sources. "According to the order of the Virginia Commissioners Majr Mayo form'd a very elegant Map of the whole Northern Neck by joining all the particular Survey's together," which was prepared for the meeting held August 3, 1737. "In this Map were very neatly and very plainly delineated the several Branches of the Rappanhannock River quite up to their several Sources, together with all the Creeks that flow into the same on either Side. The River Powtomack was therein likewise traced with great Exactness from the Mouth, up to the Fork a little beyond the Blue Ridge of Mountains, and from thence up the North Branch call'd Cohungoruton—quite away to the Head Springs thereof with all the Waters that discharge themselves into it. And the Distance Cohungoruton runs from its Confluence with Sharando, is according to the Meanders thereof 206 Miles to its Foundation. From the Hills out of which this River arises, may be seen other Waters which run Westward, and may be the Springs of one of the Branches of Missasippi, probably that commonly called Allegany. In this Map the Courses of Sharando are not described, but just where it parts with Cohungoruton, by reason such Description cou'd give no light to the Controversy betwixt His Majesty and the Lord Fairfax.

"And here I think I ought to do Justice not only to the uncommon Skill, but also to the Courage and Indefatiguable Industry of Majr Mayo and two of the other Surveyors, employ'd in this long and difficult Task, Neither the unexpected Distance, nor the Danger of being doubly Starved by Hunger and excessive Cold, could in the least discourage them from going thro' with Their Work, tho' at one time they were almost reduced to the hard necessity of cutting up the most useless Person among them, Mr Savage, in order to Support and save the lives of the rest. But Providence prevented that dread-

full Blow by an unexpected Supply another way, and so the Blind Surveyor escapt." [1]

The party which performed this work consisted of the four surveyors with thirteen assistants, six of them chain-carriers, employed at three shillings per day.

A copy of the map resulting from this survey, and probably a copy of that prepared by Maj. Mayo, is in the library of Harvard University. It bears the title "A Survey of the Northern Neck of Virginia, being the Lands belonging to the Rt. Honourable Thomas Lord Fairfax Baron Cameron, bounded by & within the Bay of Chesapoyocke and between the Rivers Rappahannock and Potowmack: with the Courses of the Rivers Rappahannock and Potowmack in Virginia, as surveyed according to Order in the Years 1736 & 1737." The map is a little sheet, about ten inches square, with the latitude represented to the minutes. It embraces 2° 15′, extending from 37° 45′ to 40° 00′ N. lat., and has no longitude indicated. The scale is about twelve miles to the inch. The chief interest arises, in the present instance, from the names employed and from the platting, probably for the first time, of the entire course of the Potomac from the Fairfax Stone to Point Lookout. This sketch likewise embodies the first accurate representation of the mountains of Garrett and Allegany counties, since upon it are located the "Allagany Mountains" [Savage Mt. and Dan's Mt.], as well as the smaller ridges lying east of the great bend in the Potomac where Cumberland is now situated.

The map is little ornamented. Besides the border for the title and the scale, the coat-of-arms of Lord Fairfax is the only indication of attempts at embellishing a sketch which was only intended to illustrate the grant of territory as agreed upon by the Proprietor and his sovereign. Among the names employed to describe features of Maryland territory may be noticed the following variations from present usage: East^{n} Branch [Anacostia], Monokasy [Monocacy], Kittokton [Catoctin], Conigochego [Conococheague], Cohongo-

[1] Byrd, William. History of the Dividing Line and Other Tracts. From the Papers of William Byrd, of Westover, in Virginia, Esquire. Vol. ii, Journey to the Land of Eden, etc. Richmond, Va., 1866, pp. 116-117.

ronta [Upper Potomac], "Wappacomo, also Great S° Fork," "Savage River also N° Fork," and Allagany Mountains. Although the map was credited to Lewis and to Byrd in the list of maps published in the first volume of these reports, it seems, after a study of the circumstances surrounding its preparation, that it should be credited to Wm. Mayo and his colleagues, who actually did the work, although several authors are accustomed to mention it as the "Byrd Map," since Col. Byrd was one of the Commissioners appointed to supplement the work and subsequently published a lengthy account of the "Dividing Line" controversy.

THE FRY AND JEFFERSON MAP, 1751.

The most important map of the Middle British Colonies published during the second half of the eighteenth century was the result of the joint labors of Professor Joshua Fry and Mr. Peter Jefferson, two Virginia surveyors of marked influence and experience throughout all of the territory of Virginia lying on either side of the Blue Ridge.

Joshua Fry, born in England during the latter part of the seventeenth century, was in 1728 appointed master of the grammar school at Williamsburg (subsequently William and Mary College), where he was afterwards advanced to the chair of mathematics. The facts concerning his life are so few that Slaughter in his Memoir says: "I know of no other person in our history of like social position, wealth, capacity, character and public services as Col. Fry, about whom there is so little to be found in print, and that little so scattered in infinitesimal items."[1] Fry was appointed Justice of the Peace and County Surveyor of Albemarle county, Virginia, in 1745, and was soon in intimate association with Jefferson, who likewise became a Justice of the Peace and a Deputy County Surveyor. Fry died at Fort Cumberland, Maryland, on his march against Fort Duquesne, May 31, 1754, when his command fell to George Washington, who was at the same time Fry's chief military subordinate and his Deputy Governor.

[1] Slaughter, P. Memoir of Col. Joshua Fry, sometime Professor in William and Mary College, Virginia, and Washington's Senior in Command of Virginia Forces, 1754, etc., etc., p. 17. [Richmond, 1881.]

Peter Jefferson was born February 29, 1708, and had a scanty early education, but possessed such a desire for knowledge and such great strength of character that he subsequently made up the deficiency by study and reading. From the time of his settlement in Albemarle county in 1738, Jefferson became an important member of the community, and was appointed to the offices of Justice of the Peace and County Surveyor, involving high responsibility and considerable education, for at that time Justices of the Peace were selected only from gentlemen of the first consideration, and County Surveyors were obliged to submit to examinations given by the professors at William and Mary College. During the years 1745 to 1750 both Fry and Jefferson were engaged in laying out government grants and in surveying the western limits of the "northern neck" by running a line from the head springs of the Rappahannock to those of the Potomac (1745), and in extending westward the boundary line between Virginia and North Carolina (1749). During these surveys both men had occasion to explore the country west of the Blue Ridge for a distance of nearly one hundred miles, and to travel over a large part of the territory west of the Shenandoah valley. Fry particularly, as we learn from his obituary notice, had acquired great experience and personal knowledge of the country which he was to traverse in his passage from Fort Cumberland to Fort Duquesne. Both men are described as possessing exceptional skill in their judgment of the due proportion of areas and distances, and it is probable that the information represented on the map indicates the highest degree of knowledge of the country attainable at that time.

The preparation of this map, which includes the territory between North Carolina and New York, Ohio and Maryland, was not hastily undertaken, but was a subject which had long been held in mind, especially by Fry, as is shown by the following notice which appeared in the *Virginia Gazette*, Williamsburg, January 5th, 1737: "Towards the close of the last session of Assembly, a proposition was presented to the House by Mr. Joshua Fry, Major Robert Brooke, and Major Wm. Mayo, to make an exact survey of the colony, and print

and publish a map thereof in which shall be laid down the bays, navigable rivers, with the soundings, counties, parishes, towns and gentlemen's seats, with whatever is useful or remarkable, if the House should see fit to encourage the same. But as said proposition was presented too late in the session, it was ordered that the consideration thereof should be postponed to the next session of Assembly." [1] The facts accumulated during the various surveys were brought together and the map apparently was completed in the year 1749, although it is dated 1751. It was published under the auspices of Virginia, and was based on much besides conjectural data. While there are many inaccuracies, and the map is often generalized from a small amount of information, it is a highly creditable production and ranks as one of the three or four maps which have exerted a great influence on the subsequent cartography of the area delineated. The work was first published under the title "A map of the most inhabited part of Virginia containing the whole province of Maryland with parts of Pennsilvania, New Jersey and North Carolina. Drawn by Joshua Fry and Peter Jefferson in 1751. To the Right Honourable George Dunk, Earl of Halifax, (etc) this map is most humbly inscribed by Thos. Jefferys engrav'd and Publish'd according to Act of Parliament by Thos. Jefferys, London." [after Philips.]

The copy published in "The American Atlas, London, 1775," which is the same as the edition of 1751, consists of two parts which unite to form a single sheet 37 3/8 by 29 3/4 inches. The drawing is on a scale of something more than 10 miles to the inch (approximately that of the Mayo map of 1737). It is uncolored except along the streams, water-lines and boundaries, where there are bands of hand-laid colors differing for each colony. The title, however, is ornamented in black and white by a contemporaneous wharf scene, in which the merchant sits at a table awaiting refreshments while he converses with two friends who stand near by. On the left are negroes moving and repairing casks, while in the background is a clerk taking account of the cargo.

The Maryland portion of the sheet does not adequately represent the high character of the map, since there is little indicated besides

[1] Slaughter, Memoir of Joshua Fry, pp. 18-19.

names and a few roads on the Maryland portion, while Virginia streams and roads are carefully delineated with their names attached. The roads are only such as were main thoroughfares connecting different portions of Virginia with Philadelphia. Two things of especial interest may be noted in the 1775 copy of the map, viz., the simultaneous representation of Baltimore on the Bush river with the Baltimore Iron Works on the Patapsco, and the location of a coal mine[1] on the left bank of the Potomac not far above the mouth of the Savage river.

The relief indicated, which is so characteristic of the map and its various modifications, shows a grasp of the linear arrangement of the ridges in a N.E.-S.W. direction, but otherwise is arbitrary and mechanical. In this respect the work of Fry and Jefferson is not to be compared with that of Griffith, which appeared only seventeen years later. In the latter the representation of the Blue Ridge and the Catoctin mountain is far superior.

From the similarity in scale and draughting, as well as the close friendship between the authors of this map and the surveyors of the Fairfax lands, it is evident that considerable credit should be given to William Mayo and his colleagues of the survey of the Northern Neck. Wherever the credit for it should be placed, this map has exerted a great influence on the cartographic representation of Maryland, and in a greater degree on that of Virginia, from the time of its first publication in 1751 till the work of Alexander (1834-40) in Maryland and the survey of Virginia during 1828-29.

CRESAP'S MAP OF THE SOURCES OF THE POTOMAC, 1754.

The Cresap map of the area, based on personal observation, was drawn by Col. Thomas Cresap. The author of this map was a well-known settler in the extreme western portion of the province, a typical frontiersman who was familiar with the country and engaged in all sorts of exploring and hunting expeditions through the moun-

[1] This is also seen on the Dalrymple map of 1755, which claimed to be "from information collected on the spot and entered in his journal" by the author. Its appearance suggests a very liberal use of Fry and Jefferson's work of 1751, and in the lower sheet the information is credited to them at least in part.

tain wildernesses about the branches of the Potomac. At the request of the Maryland Council, Cresap undertook a survey of both the north and south branches of the Potomac, in order that their true position and relative length might be accurately laid down on a map which should serve as a basis for the settlement of the western boundary line between the territories of Lord Baltimore and Lord Fairfax. The work of surveying was first attempted in 1754 and some sort of a map was placed in the hands of Governor Sharpe in the early part of June (Arch. Md., vi, p. 72), but the outbreak of the French and Indian war prevented any satisfactory study of the territory, and Cresap, in 1756, was compelled to write to the Proprietary that "no survey could be safely made within 80 miles of the South Branch by less than a body of 100 or 200 men." The amount of information gathered during this attempted survey and already acquired in previous expeditions through the territory by the author are found roughly represented in a sketch-map of the area which has been reproduced in Appendix D of "The Report of the Committee on the Western Boundary of Maryland."[1] This map was drawn approximately on the scale of twenty miles to an inch, and possessed little information beyond a general outline of the courses of the north and south branches of the Potomac and the location of the boundary lines drawn from the North Fountain and the South Fountain respectively. The Monongahela is described as "A large River navigable for small Crafts, a Branch of Ohio River, runs into Mississippi."

The work of Cresap, embodied in the map of 1754, is of importance since by it was first established beyond doubt the fact that the northern bend of the Potomac at Cumberland is not north of the Mason and Dixon line, as it was feared by the Marylanders and claimed by their neighbors. The original draft of the Cresap map was deposited in the Land Office in 1771.

EVANS' MAP, 1755.

The energy of the Virginians which led to the publication of the Fry and Jefferson map was ably supplemented by the intelligent zeal of the inhabitants of Philadelphia, which stimulated Lewis Evans

[1] *Maryland Hist. Soc. Fund Pub. No. 29, Balto., 1890.*

to bring forth one of the most carefully compiled maps constructed in the colonies during the third quarter of the eighteenth century. This was accompanied by a small quarto volume containing "An Analysis Of a General Map of the Middle British Colonies in America, (etc.)," which was intended as the first of a series of "Political, Philosophical and Mechanical Essays."[1]

It is difficult to estimate just what credit should be given to Evans for this map, and for an earlier one published in 1749 bearing the title "A Map of Pensilvania, New-Jersey, New York, And the Three Delaware Counties: By Lewis Evans. MDCCXLIX."[2] The latter abounds in interesting meteorological observations which may have originated with Evans' publisher, Benj. Franklin, while the former is frankly acknowledged in the "Analysis" to be a compilation of existing information supplemented by that gained through personal observations in many portions of the territory depicted. That he was regarded as a loyal Pennsylvanian who might allow his partisan allegiance in the disputes over the boundary line between Maryland and Pennsylvania to overbalance an accurate representation of the natural features may be seen in the following extract from a letter[3] of Calvert to Governor Sharpe, dated April 17, 1754:

"Entre nous, I understand Mr. Evans is a man of no good Character, and has been a time Serving man to the Messieurs Penns. The Map from whence the Articles of Agreement with the Late Lord and Messieurs Penns was by Artificial means imposed on the Late Governor and sent by him to the late Lord, [has been] the Product of much Uneasyness to the present Proprietor."

Referring to the preparation of his map of 1755, Evans says: "I am obliged to the same Map [Fry and Jefferson], and Capt. Hoxton's chart of *Chesapeak Bay*, for *Mariland*. But this Colony is the worst done of all the Settlements in mine, yet the Bay from Annapolis to the Head, I have lately had an Opportunity of adjusting;

[1] Philips, in his "Cartography of Virginia," p. 50, gives the title as "Geographical, historical, political, philosophical, and mechanical essays." This is apparently the form in the first edition, as the shorter form is from the second edition published during the same year.

[2] See W. M. Davis, Jour. Franklin Inst., Feb., 1889.

[3] Archives of Maryland, vol. vi, 1888, p. 50.

as well as to measure the Isthmus across from the Head of Elk to Delaware River, about three Miles below New-Castle. There is a considerable Error in my General Map, which came Time enough to my Knowledge to be mentioned here, tho' not to be rectified; and that is, the Breadth of the Peninsula from Fenwick's Island to the South Side of Little Choptank, which I make 65 Miles, whereas, Mr. Parsons, one of the Surveyors, who ran the line across, informs me that it should have been 70" (p. 5). The Evans' map thus follows the Fry and Jefferson map in the western portion of the state, but differs from it in these particulars. Since "an actual Survey from Philadelphia to the Mountains, near the great Bent of Potowmack, by the Pensilvania Surveyors in 1738, enabled me to give the just Longitude of that Place from Philadelphia, which they [Fry and Jefferson] mistook by 10 to 12 Miles; and this obliges me to give Potomack, and the whole Country, a Position somewhat different. As that Performance [Fry and Jefferson's] is very valuable, I contrived mine to interfere as little as possible with it; and omitted the Counties and numerous Gentlemens Seats that it contains, to give Room for the Roads, Inspection-houses, Court-houses, and the Seats of some half a Dozen Gentlemen, noted in a literary Way."

This advance in the location of the great bend in the Potomac is hardly noticeable without a close comparison of the different maps, but serves as one of the means by which maps based on Evans' authority may be distinguished from those after the earlier work of Fry and Jefferson.

Little is known concerning the first publication of the Evans map of 1755 beyond the facts already recorded, but the impression left on subsequent drawings of the same area is marked. During the year following its first appearance in America it was republished in London, and two years later it was published "with improvements" by I. Gibson and by Thomas Jefferys. The last serves as plate No. 32 in Jefferys' "A General topography of North America and the West Indies," London, 1768, and as No. 18 in his "American Atlas" of 1775. About the same time (1776) I. Pownall, Governor of Pennsylvania, published in London a "General Map of the British

Middle Colonies," which was engraved by T. Almon. The work, because of Pownall's position and his previous explorations, became an authority which was reproduced or acknowledged as a basis in most of the maps published in Europe to illustrate the situation of the contending forces during the Revolutionary war. In this capacity it appeared with corrections in "The American Military Pocket Atlas" published by R. Sayer and J. Bennett in 1776; in enlarged form in 1786; and finally somewhat modified in the various editions of "A New Universal Atlas" by Thomas Kitchin. (The latest of these issues seen was dated 1799.) The different editions show variations in spelling, in the towns chosen for representation, and even in the location of the different places. For instance, all of the sheets seen are characterized by the towns of Onions and Kingsberry in Baltimore county, while Cresaps (variously spelled) is located not far from the mouth of the south branch of the Potomac instead of in the meadow lands of Will's mountain as at present.

Although credited to Pownall, these various sheets are little more than modified editions of Evans, who, in turn, with the exceptions noted, followed the map of Fry and Jefferson, who were probably familiar with the earlier work of Mayo and the Fairfax Commission.

GRIFFITH'S MAP, 1794.

The very close of the century was marked by the publication of the best compilation of existing geographical information concerning Maryland up to the work of the Topographical Engineer of the state, J. H. Alexander, during the fourth decade of the present century. This work, which will stand comparison with the best maps yet published of the northern border of the state, was drawn by Dennis Griffith, a Philadelphian, and copyrighted June 20th, 1794, with the somewhat lengthy title,

"Map of the State of Maryland Laid down from an actual Survey of all the principal Waters, public Roads, and Divisions of the Counties therein; describing the Situation of the Cities, Towns, Villages, Houses of Worship and other public Buildings, Furnaces, Forges, Mills, and other remarkable Places; and of the Federal Territory; as also a Sketch of the State of Delaware; showing the probable Connection of the Chesapeake and Delaware Bays; by Dennis Griffith."

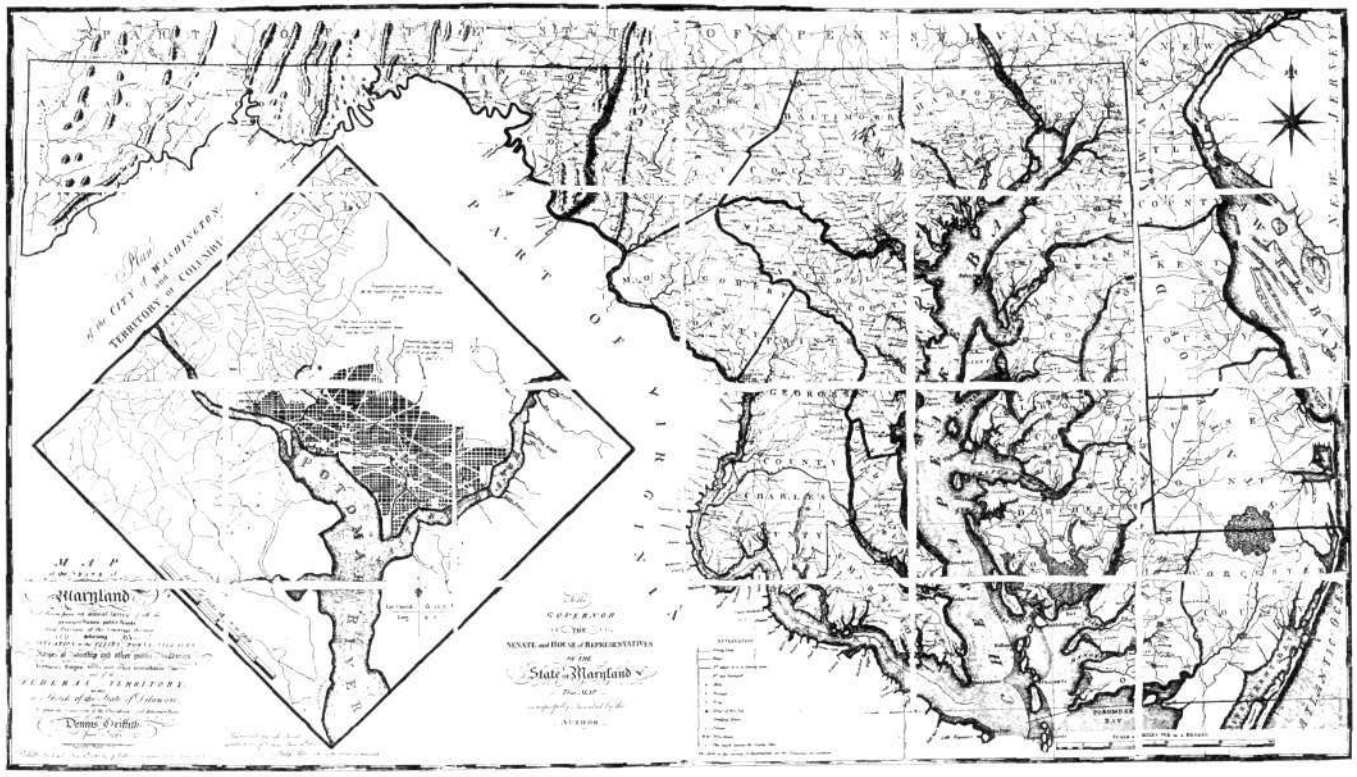


FIG. 32.—Griffith's Map of Maryland, 1794, reduced.

The first edition of this large work was published in Philadelphia, June 6th, 1795, by J. Vallance, who was the engraver of the map. Eighteen years later (May 28th, 1813) a second edition was published by John Melish. There is evidently little difference between the two issues, since a copy of the second edition in the Harvard Library has the change in edition and publisher pasted over a portion of the title while the date of copyright remains the same. The engravers in the later issue are J. Thackara and J. Vallance.

This map, which reminds one very forcibly of the county maps of seventy-five years later, is a sheet 52x30 inches in size, and the scale is between four and five miles to the inch. On this base in different colors are outlined the counties of the state, and wherever occasion demands, the roads, towns and waterways as indicated in the title. Although it is claimed by the author that "the lines have been laid down from an actual survey," it has been impossible to find any reference to the man or his work beyond the date of his marriage. It seems accordingly somewhat doubtful that more than certain portions of the area were visited by him. The work is executed with more than usual skill, and possesses considerable interest in the present connection from the indication of iron works in Washington county, north of Elkton, at Principio, etc.; glass works at Middletown, copper mines at Creegarstown, etc. There is also evidence of several attempts to change the names of well-known towns. For example, Hagerstown is given the name of Elizabethtown, Havre de Grace is called Susquehanna City, while Rockville is still indicated as Montgomery C. H.

Between the issuance of the first and second editions this work of Griffith's gained considerable influence in Europe, in a reduced and translated form, as "Maryland und Delaware von D. F. Sotzman," which was published in Ebeling's "Erdbeschreibung von Amerika" in 1797.

Later Work on the Chesapeake.

While the first accurate knowledge of the country west of the Blue Ridge was being gathered in the form of maps, the work along the shores of the Chesapeake Bay was continued in greater detail, especially with reference to the hydrography of the region. From this

activity resulted three maps of considerable importance and in one instance of some influence. The subjects treated are the Eastern Shore, the waters of the Bay, and territory adjacent to Havre de Grace.

CHURCHMAN'S MAP, 1778.

The active interest developed at Philadelphia in the study of the natural resources of the colonies, and the public-spirited endeavors to improve the communication between the scattered settlements, led a few enterprising citizens to ask the American Philosophical Society to institute a survey of a portion of the peninsula between the Chesapeake and Delaware Bays, in order to ascertain the possibility of the construction of a canal between these two bodies of water. It is probable that John Churchman, Sr., was actively engaged in this work, for the Churchmans lived in the neighborhood and might be "termed a family of surveyors, as the calling was exercised by the two Johns, father and son; by George, son of the second John, and by John, Micajah and Joseph, sons of George." The information acquired at the time and the general trend of investigations in this region seem to have descended to John Churchman, Jr., or John the Philosopher, as he was sometimes called, who was born in 1753 and died in 1805. This eminent surveyor and geometrician published a series of maps, charts and atlases, among which are two of marked importance, entitled "To the American Philosophical Society This Map of the Peninsula Between Delaware and Chesapeake Bays with the said Bays and Shores adjacent drawn from the most accurate Surveys is inscribed by John Churchman" and a "Magnetic atlas, or Variation Charts of the whole terraqueous Globe, London, 1794." The latter brought him into prominent notice both in America and abroad, where he was highly esteemed as an authority on scientific subjects, while the former is of especial interest from the fact that a claim exists that it "is upon the largest scale of any ancient map we have seen, and altogether the most accurate, except that it is singularly erroneous in the location of Tangier and Watts island."[1] The scale

[1] Rept. and accompanying documents of the Virginia Commissioners appointed to ascertain the Boundary Line between Maryland and Virginia. Richmond, 1873, p. 50. This seems to show a lack of familiarity with the

is approximately ten miles to the inch, and the legend, as above cited, is in the southeastern corner of the map, which is ornamented by smaller sketches and figures. The area included embraces the territory of eastern Virginia, Eastern Shore of Maryland and Delaware, and all the land between the Chesapeake and Atlantic ocean. The Western Shore of the former is also roughly sketched. The recognized counties of the Eastern Shore (except Wicomico [1]) are separated from each other by hand-colored boundaries. The creeks are broad and the roads are drawn freehand. Along the water-line and in the bay are represented the shoals and sandbanks of both the Chesapeake and Delaware waters, while over the map are scattered the names of the principal towns. The map was published without date or place. The year given is based on Johnston's statement on page 526 of his "History of Cecil County." The map itself points to an earlier date, since on it appears "West New Jersey," which was not in use after 1776. It cannot be assigned to a much earlier date because of the youth of the author.

ANTHONY SMITH'S CHART, 1776.

The chart of Chesapeake Bay which was best known during and just subsequent to the Revolutionary war was published in the "North American Pilot" in its various editions. In its earliest form, as published by Sayer and Bennett (?), it bears the title "A new and Accurate Chart of the Bay of Chesapeake with all the Shoals, Channels, Islands, Entrances, Soundings and Sailors marks, as far as the Navigable Part of the Rivers Potowmack, Patapsco and North East. Drawn from several Draughts made by the most experienced navigators chiefly from those of Anthony Smith, Pilot of St. Mary's." Some of the editions add "compared with the Modern Surveys of Virginia and Maryland." On the map is also a "Plan of Herring Bay in Maryland" on an enlarged scale.

Nothing is known of the actual authorship of this chart, although it is here assigned to an Anthony Smith of St. Mary's. No record

Anthony Smith and Hoxton charts, as well as a lapse in memory regarding the scale of the Herman map.

[1] Wicomico was not a separate county at that time.

has been found concerning this man, who, to judge from the charts, must have been exceptionally well informed regarding the subaqueous and littoral characteristics of Chesapeake Bay and its estuarine rivers. Certain copies of the chart have a text upon their face indicating that the work was done by some naval officer who employed Smith as his pilot. Such certainly was the arrangement in making a survey of the Potomac, although earlier less authentic but apparently no less accurate soundings had been made with considerable system.

This Smith chart was composed of four large sheets each 18 by 27 inches, combined to form a single map 36 by 54 inches, the size and scale, about 3½ miles to an inch, affording sufficient room for a large amount of detail. Apparently all of the prominent houses visible from the water are indicated with a manifest effort to represent the shape, size and relative positions of the different structures, which are distinguished by the names of their owners. On the blank portions of the sheets are given sailing directions, involving mention of many of the buildings placed on the headlands. Besides these features, which might prove of historical interest, there are many figures and lines showing the courses to be followed, the bearings of prominent landmarks, and the depth of water along the streams and bay. This map has the longitude in degrees from London.

Subsequent to its first appearance in London, a French edition was published in 1778, and English editions appeared in "Norman's American Pilot, 1798," and the North American Pilot, part two, 1800.

HAUDUCOEUR'S MAP, 1799.

The third map mentioned, that of the territory about Havre de Grace, seems to be the product of an attempt to make this place a prominent port and city for the transhipment of freight. The sheet, which resembles the charts prepared by the U. S. Coast and Geodetic Survey, is beautifully executed, and the topography of each side of the Susquehanna is as well represented in hachure as in any map of the region yet published. The territory included in the

sheet, which is 22 by 29.5 inches, extends from Spesutia Narrows to a point about five miles north of the Mason and Dixon line. Over this district on either side of the river the roads, streams, property lines, houses and state of cultivation are represented with apparent fidelity. Many of the roads and farms bear names. The streams and banks of the river are well drawn, and considerable effort was made to represent the character of the bottom underlying the river and the head of the bay. In the river the different falls are indicated, and below Havre de Grace the depth of water is given in feet. "The Soundings here quoted," the text says, "have been taken in the months of September and October the driest time of the Year. They are the result and average of fourteen days observations at different hours hence more water will be found in wetter seasons and full tides." The text in addition gives the following: "By repeated Hydraulic and Hydrostatical observations the Author has found that the River Susquehannah discharges in every second of time a volume of 70,450 Cubic feet of water he computes that this volume of water is generally increased in a triple proportion in high freshes."

The fall in the Susquehanna from Luff's Island near the state line to tide is 57½ feet.

The latitude of Havre de Grace is 39° 33′. The longitude from Washington is 58′ E. and from Philadelphia is 59′ W.

In connection with this map and the prophecies thereon contained, it is interesting to compare a "Chart of the Mouth of Susquehanna River and Head Waters of Chesapeake Bay, Maryland. Surveyed by order of Congress Under the direction of G. W. Hughes, U. S. Civil Engineer, by J. T. Lee and C. N. Hagner. Drawn by T. J. Lee, 1836." This sheet includes about the same territory on approximately the same scale. A great many soundings are given, especially along the present channel, and bathymetric contours are given for each three feet. In the upper right-hand corner of the later sheet is given a copy of Hauducoeur's soundings, 1799. A comparison of the two sets of determinations seems to indicate a silting of the sides and re-entrants, with a slight scouring and straightening of the channel in a few places. The Eastern Channel toward Turkey Point is much shallower in the later map.

The Era of Internal Improvements.

As soon as the leading men of colonial days realized that their colonies were merged into a republic they recognized the fact that there could be no permanency without easy communication and interchange of thought and goods between the scattered members of the United States. To establish the political life begun and to increase the material resources of the yet undeveloped country, the general government, states, syndicates, and private citizens began a series of far-reaching internal improvements.[1] This wave of enthusiasm, which

[1] The following are among the more important enterprises undertaken in Maryland:

1767 Chesapeake and Delaware Canal proposed.
1783 Susquehanna Canal.
1784 "Potomac Company."
1784 Canal from Basin to Ferry Branch of Patapsco.
1796 Improvement of.
1799 Revival of Chesapeake and Delaware Canal project.
1812 Revival of Chesapeake and Delaware Canal project.
1817 Patapsco Canal.
Canal from Curtis Creek to Severn.
Canal from Severn to Potomac (Washington and Baltimore Canal Co.).
1822 Chesapeake and Delaware Canal.
1822 Baltimore and Conewago Canal.
1823 Chesapeake and Ohio Canal.
Baltimore Canal.
1824 Canal from Fishing Bay to Nanticoke River.
1825 Canal in Dorchester County.
Canal from Quantico Creek to Nanticoke.
1825 Susquehanna and Potomac Canal.
Maryland Canal.
1826 Baltimore and Ohio R. R.
1827 Elkton and Wilmington R. R.
New Castle and Frenchtown.
1828 Baltimore and Washington Turnpike.
Baltimore and Susquehanna R. R.
Frederick County Canal.
Annapolis and Potomac Canal.
1830 Washington Branch Baltimore and Ohio R. R.
1831 Wilmington and Smyrna R. R.
Alleghany Coal Mine R. R.
Sam's Creek R. R.
1832 Baltimore and Port Deposit R. R.
Lewis and Pocomoke Canal Co.
Delaware and Maryland R. R.
1836 Eastern Shore R. R.
1837 Wilmington and Susquehanna.

was at its height during the second and third decades of this century, swept the country, leaving as a result long lines of public highways, canals and railroads. Each class of works required a knowledge of territory hitherto unexplored, which was acquired by many detailed surveys and recorded in musty field-notes and a few old maps. The latter are of little value in the present connection.

Each of the three classes of enterprise—canals, highways and railroads—found earnest advocates in Maryland, and within the state are three of the most important products of this eventful epoch—the Cumberland and National Road, the Chesapeake and Ohio Canal, and the Baltimore and Ohio Railroad. Besides these are others of less extended influence which mark the less successful attempts to control the growth and direction of trade for the sake of Baltimore. Three problems stood uppermost in the minds of Marylanders. The first was the avoidance of the long sail down the Chesapeake and up the Atlantic by means of canals across the low-lying Eastern Shore; the second was the development of some means by which the trade of the Susquehanna valley would be diverted from Philadelphia to Baltimore; and the third was the capture of the future western trade by easy means of communication across the Alleghanies.

THE CANAL MAPS.—CHESAPEAKE AND DELAWARE CANAL.

The solution of the first problem stimulated the survey of the territory along the Sassafras, the Choptank and the Transquakin, and resulted ultimately in the construction of the present Chesapeake and Delaware Canal. As early as the last of the seventeenth century Augustine Herman appreciated the probable drift of enterprise and settled on the Bohemia river, believing that this body of water would sometime be a portion of an inland watercourse between the cities of the Atlantic coast. It is reported that this far-sighted colonist actually made a preliminary survey of the country between the two bays to determine the practicability of this scheme. Nothing came of the project, however, until it was revived nearly a century later. From an old work on the "Internal Navigation of the United States," published anonymously at Philadelphia in 1824, "we find, that as early at least as the year 1767 or 1768, the matter was seriously taken

up, and prosecuted by Mr. Thomas Gilpin and other gentlemen; who were at great pains in accomplishing a number of surveys, and giving estimates to the public, for a canal from Duck Creek to the head of Chester. In 1769, a condensed view of all that had been done, was presented by Mr. Gilpin to a committee of merchants, formed in Philadelphia, for the purpose of improving the trade of the province; as also to the American Philosophical; and this was soon followed by a survey, and remarks upon another route; viz. from Bohemia river to Appoquiminink; after which the Elk route was also examined" (p. 80). This canal, for which so many surveys were made, was actually commenced in 1824 and finished a few years later. The work of Thomas Gilpin was finally brought together in a volume by his son Joshua Gilpin, one of the directors of this canal company, and published at Wilmington under the title "A Memoir on the rise, progress, and present state of the Chesapeake and Delaware Canal accompanied with original documents and maps." This little volume shows that the surveys made by Thomas Gilpin were conducted during the years 1767-68, and the report is accompanied by five small maps as indicated below:

a. The route from Chester to Duck Creek by T. Gilpin, 1769.

b. The route from Bohemia to Appoquiminink.

c. The route from Elk to Christiania.

d. General surveys of canals, roads, etc., made by the Philosophical Society in 1770.

e. Map of the present designated route.

All these maps are small and represent little increase in knowledge regarding the territory beyond the accurate location of given points along the course of the proposed canal. In a few instances the profiles accompanying the sketches give some data regarding the topography of the territory traversed. It is highly probable that the information recorded on these maps was in possession of Griffith, and probably Evans, when they made their maps of the territory.

The efforts to increase the trade of Baltimore by canals fall into two groups determined by the country traversed. The trade along the Susquehanna was approached by the Baltimore and Conewago and

the Port Deposit and Baltimore Canals, while that of the Potomac and the West anticipated the use of the Maryland and the Chesapeake and Ohio Canals. These various undertakings, involving the construction of more than 500 miles of canal across mountainous and hilly country, were never wholly completed, and the last named is the only one now in active operation. Each of the four schemes, however, fostered one or more surveys of intervening territory, which resulted in the acquisition of a large amount of detailed information regarding the topography of the state, and many of the reports made by the surveyors were accompanied by maps showing something new in the delineation of the areas represented.

BALTIMORE AND CONEWAGO CANAL.

The investigations of the commissioners appointed by the state in 1822 to lay out and survey a route for a canal which should connect the waters of the Susquehanna with the city of Baltimore, etc., led to several surveys of the country between Baltimore and York Haven on the Susquehanna, some forty miles above Mason and Dixon's line, and the preparation of a report accompanied by two maps. A line of levels was carried by Mr. Poppleton from tidewater at Baltimore along the York Pike to York, Pennsylvania, thence via York Haven to the head of the Conewago Falls, and thence up the river to Harrisburg. At the same time Captain Hartman Bache and Lieutenants Eakin, Graham, and Boyce carried a series of levels from the head of Conewago Falls down the right bank of the Susquehanna to tide at Lapidum, opposite Port Deposit, and Messrs. Bridges and Jehu Bouldin, the latter city surveyor of Baltimore, surveyed the country between Havre de Grace and Baltimore along the upper edge of the Coastal Plain. These various surveys added considerable information regarding the territory of Harford and Baltimore counties, which up to this time had received little attention since the time of Herman. The data obtained were incorporated in a "Topographic map of the route of the proposed canal and the country between Conewago and Baltimore drawn by direction of the Canal Commissioners by F. Lucas, Jr." This map, which is 18.7 by 15.7 inches in size, on the scale of 3.7 miles to an inch, is drawn in black and

white, with hand-colored zones indicating the boundaries between the counties and states, the water area between the shores of the Susquehanna, and the location of the proposed canal. Somewhat generalized roads are drawn over the interior portions of the map representing the various pikes radiating from Baltimore and Belair, on which are given the altitudes of the various rivers and streams intersected by different lines of levels, especially along the York Road. The streams which are indicated on the map include drainage lines such as the "Gwinne's Falles," Jones' Falls, Great and Little Gunpowder, Deer creek, and many small streams flowing into the bay. These are apparently well located at their mouths and at their intersections with the turnpikes surveyed, but the parts of their courses between such intersections are drawn arbitrarily, with only an approximation toward the general curves of their courses and with no accurate detail. The map, however, is the first one to represent the accurate sources and general courses of several of the streams of this region. Lines of hachures indicate the "fall line," or the boundary between the Coastal Plain and the Piedmont Plateau, and the "Slate Ridge." As the latter is recognized in the text as but a part of a zone of high land extending from the Potomac to the Susquehanna, this seems to be the first recognition of the general elevation of the country now included in Parr's Ridge.

Although an improvement over preceding maps in its delineation of the interior of the country, it is far below them in the accuracy with which it represents the shore line. This shows frequent distortions and wavings of the coast line which are wholly contrary to nature. Moreover, certain of the streams, such as Romney creek, are entirely different in their shape and character, since they are represented as large estuaries running in directions sometimes nearly at right angles to the courses represented in the most authoritative drawings.

The second map accompanying this report is entitled "A map showing the extent of the Susquehanna country and its Practicable Canal Routes as designated by the Susquehanna Commissioners." This adds nothing to the pre-existing knowledge of the area, although

much information had been acquired concerning the northeastern portion of the state. The base of the map, while redrawn by B. T. Welch, is really only a modified copy of the well-known map of Fry and Jefferson published some seventy-five years earlier.

A third map, which seems to be the result of the same commission, is entitled "Map of the route for a Canal and Still Water Navigation from Port Deposit to Baltimore. Drawn under the direction of the Commissioners by W. F. Small, Engineer." This sheet is 17.8 by 14.2 inches in size and possesses hand-colored waterways and boundaries. The scale is approximately 4.75 miles to an inch, and the territory represented extends from McCall's Ferry and Philadelphia on the north and east to Baltimore on the southwest. The map is very similar to the first, or "Lucas," map, from which it differs, however, in size, scale, and minor features. There are indicated a "Saters Ridge" [Setters Ridge], a "Slate Ridge," "Highlands of Pennsylvania," and three small hills near Elkton, each showing marked vertical exaggeration. The whole map, as is the case with several of those by Lucas, suggests a generous use of the Griffith map, but the names and the cultural features are variously modified.

MARYLAND CANAL.

The extension of canal communications from Baltimore to the Potomac resulted during 1838 in the survey of several routes for the proposed Maryland Canal, which was never built. The work was under the direction of Col. J. J. Abert of the U. S. Topographical Engineers, who examined the country of Anne Arundel, Howard, Carroll, Montgomery, and Prince George's counties in search of the most advantageous location. The first three choices for the route were platted on a map which was apparently published in Annapolis in 1838 and subsequently reprinted for the use of the U. S. Engineers, 1874. This reprint is 28 by 22 inches in size and includes the country between the Patuxent and the Monocacy from the Liberty Road to Rockville, on a scale of approximately a mile to an inch. According to a portion of the legend this is "compiled by T. J. Lee from actual surveys made in 1838" and bears the title "Map of the Country embraced in the Surveys made in 1838 under the direction

of Col. J. J. Abert for routes for the proposed Maryland Canal." The drawing is clear, the locations of the proposed sites for the canal, its feeders and the interseeting roads, are given with considerable detail. The streams also are drawn with care, while the broad outlines of the topography of Parr's Ridge are given in hachure. These features of the topography and drainage show an advance over the earlier maps, but are inferior in completeness to the work of Alexander published in 1840.

THE CHESAPEAKE AND OHIO CANAL.

The most important and far-reaching in influence of the canals constructed in Maryland is the Chesapeake and Ohio Canal. The credit for first proposing such a stupendous undertaking belongs to Richard Henry Lee, who suggested the enterprise to the Virginia legislature as early as 1769. Later the Potomac Canal Company in the years following 1784 constructed a canal part way up the Potomac.

The location of the Chesapeake and Ohio Canal furnished occasion for many preliminary and location surveys which largely increased the existing knowledge of the country along its course, but so far as it has been possible to learn, most of the information then acquired was not published in the form of maps constructed accurately from the surveyors' field-notes. Manuscript maps, however, were published and accompanied many of the reports. Some of these are still in existence, while others have slipped out of the knowledge of the engineers now in charge. According to a report on the extension of the Chesapeake and Ohio Canal to the Ohio river by Major William E. Merrill, Corps of U. S. Engineers, made to the Secretary of War in 1824,[1] the first examination and survey of the routes for a canal to connect the Chesapeake Bay and the Potomac river on the eastern, with the Youghiogheny and Monongahela valleys on the western slope of the Alleghany mountains, was made in the summer of 1824, and was chiefly to determine the practicability of the undertaking. This was almost entirely restricted to the examination of the moun-

[1] House Executive Documents, 43rd Congress, First Session, No. 208, p. 59.

tain or summit section from Cumberland and the north branch of the Potomac to the junction of the Youghiogheny and Castleman rivers at Turkeyfoot. The route surveyed in 1824 was by the north branch of the Potomac to the mouth of Savage river, thence by Savage river, Crabtree creek and a branch of Crabtree creek to Bear and Deep creeks, and thence by the Youghiogheny to Turkeyfoot. That part of the route from Cumberland to the mouth of Savage river was surveyed by Major J. J. Abert, Topographical Engineers, and the remaining portion by Captain Wm. G. McNeill, Topographical Engineers. During the next year a more careful and detailed survey was made to determine the route to be recommended, and also to obtain the data necessary to frame a general plan of the work and a preliminary estimate of the expense. The report for 1826 was more complete than the former one and discussed the character and general features of another route—that by the valley of Wills creek leading northerly and easterly from Cumberland and crossing the mountains to the valley of Flaugherty creek, which empties into Myer's Mill, and thence into Castleman river, a branch of the Youghiogheny which it joins at Turkeyfoot, near Confluence. Various reports, presented either as annual reports, reports of the engineers or reports of the Board of Internal Improvement between the years 1825 and 1875, contain many facts on the flow of streams, their profiles and the general character of the country, especial emphasis being laid on the rainfall, the rate of evaporation and other subjects so essential to the successful operation of a canal.

Although a large amount of literature has been published in the Congressional Documents, in the reports of the Virginia and the Maryland Legislatures, and in separate pamphlets, there is really little of the actual results of the surveys contained therein, and the maps accompanying them are almost all poor drafts, incommensurate with the amount of information acquired by skilled engineers. The chief causes of the publication of so much literature were the difficulties in raising money for the completion of the work, and the litigation arising from the dispute with the Baltimore and Ohio Railroad regarding the right of way in the valley of the Potomac between the Point of Rocks and the Savage river.

THE RAILROAD MAPS.—BALTIMORE AND OHIO RAILROAD.

While the advocates of the canal system were energetically endeavoring to show that waterways were more economical and beneficial than highways, engineers were actively engaged in devising the machinery and in pushing forward the work on railroads. It is a fact well known to Marylanders that in this early promotion of railroading none surpassed in zeal and skill certain eminent engineers of the Baltimore and Ohio Railroad. Although carefully executed surveys were conducted as described in the succeeding pages, the topographic facts acquired found expression in but few maps constructed by the engineers of the company. The information gained during the building of the road from 1827-1839, however, must have been in the hands of Alexander when he constructed his large manuscript map of the state in 1840, while accurate locations of the Patapsco, Bush creek, and the Monocacy were first gained by the work of the railroad surveyors.

As early as 1827 Col. Stephen H. Long and Jonathan Knight were selected to make surveys of the proposed road, and the following engineers were detailed by the United States to assist in the work—Capt. Wm. Gibbs McNeill, Lieuts. Joshua Barney, Isaac Trimble, Richard E. Hazzard, Wm. Cook, Walter Gwynn, John L. Dellahunty and Wm. Harrison, Jr. These surveyors made a reconnaissance between Baltimore and Washington and thence up the Potomac across the mountains to the Ohio, and a report was prepared by Messrs. Long and Knight in April, 1828. The annual report of the president of the road published during this same year contains a small sketch, 13.4 by 7.7 inches, drawn on a scale of about a mile to an inch, which represents in black and white the location of the railroad as far as Ellicott City. With the third annual report of the president which appeared the succeeding year (1829) is a "Map of the Country Embracing the various Routes surveyed for the Baltimore & Ohio Railroad by order of the Board of Engineers Drawn by Lt. T. Barney, U. S. A." This sheet, which is 23.5 by 9.7 inches in size, is drawn in black and white on a scale of approximately 3.1 miles to an inch. On it are represented by hachures the hills and drainage of the country bordering what is now the "main line" of the railroad. So far

as is known, this is the first detailed delineation of Howard and Carroll counties based on careful work, and as far as it extends it has remained of value in indicating the hills adjacent to the railroad. This map was republished in the succeeding year, and no doubt served as a basis for maps of the eastern end of the road for several years. In 1833 B. H. Latrobe prepared a "Map & Profile of the Projected Lateral Railroad to the City of Washington [etc.]," which accompanied the seventh annual report of the president. This was drawn on the scale of a mile to an inch and represents the intersecting roads and drainage of the area traversed. Somewhat later (1835) Jonathan Knight prepared a "Map of the Country between Cumberland and the Ohio representing the Routes reconnoitred with a view to the extension of the Baltimore & Ohio Rail Road to that River." This map, which was drawn by Mr. H. R. Hazelhurst on a scale of five miles to an inch, accompanied the ninth annual report of the president and represents practically all of the original mapping done by the railroad engineers until the appearance of Latrobe's "Map and Profile" in 1850, which marks the completion of the pioneer work across the state. The location of the Baltimore and Ohio Railroad has furnished a carefully surveyed and leveled line which has served as a datum upon which to construct profiles or from which to run levels across less accessible portions of the state. The work does not represent the first mapping of the region, especially along the Potomac, neither does it give the first determination of the slope of the country, for the "total descent of the river as well as its length were determined by examination and by survey by the Potomac Co., created in 1784 at the instance of Gen. George Washington."[1] The levels were extended to Deep creek in the Glades of Garrett county about 1824.

Every railroad operated within the state has given rise to one or more surveys, and the results obtained by the surveyors have often been expressed in maps. The time when these maps have been published and their own character have precluded the opportunity to represent many new features of the country surveyed. For this reason the later work has not been discussed in detail.

[1] House Doc., 20th Cong., 1st Sess., No. 47, p. 89.

THE SHRIVER MAP.

Although the numerous surveys for canals and highways were often productive of increased detailed information concerning places already explored, their influence on the cartography of the state, lay in the increased tendency to travel, which developed a demand for maps and clarified the previously confused conceptions of much of the territory opened to travel. Many of the maps which came into prominence during the period under discussion were prepared by engineers who were employed in some phase of the work, and no one of them was of greater importance to the western portion of the state than that by Jas. Shriver, a nephew of David Shriver, who was engineer in charge of the eastern half of the National Road from Cumberland to Wheeling.

Shriver's "Map of the Country through which a Canal to connect the waters of the Chesapeake and Ohio is proposed to pass and of the National Road between Cumberland and Wheeling with adjacent Country from Actual Survey," was originally published by F. Lucas, Jr., of Baltimore, as a sheet 18 by 27 inches in size.

This sheet includes all of the state west of Cumberland, as the routes to Pittsburg and to Wheeling are both represented. The topography of the region is expressed in some detail, especially in that portion of the state west of Little Back Bone Mountain, where Shriver did most of his work. The mountains are drawn in hachures with considerable sympathy and accuracy, and the names now in use are almost always employed. The swamps are indicated by conventional signs or words, while the meadow lands and glades are faintly tinted, and the cultural features, such as the roads, towns and residences of prominent citizens, are given with considerable fidelity to the facts. Scattered over the sheets are such words as "iron ore," "coal," "sugar maples," etc., indicating sources of wealth.

In the lower left-hand corner of the sheet is "an enlarged section of the summit level," 6 by 9 inches in size, drawn on a scale of approximately 1.5 miles to an inch. This shows the slope and distribution of the glades on either side of Deep creek. Although out of date, the location of immovable features compares favorably with any of the maps existing prior to the recent work of the Federal sur-

veyors. This secondary map represents the results of a large amount of work by its author while in charge of the surveys of the glade country and of a study of the water supply for the summit level of the Chesapeake and Ohio Canal.

The Work of John H. Alexander, 1833-1840.

The year 1834 marks the beginning of an undertaking which, if carried out, would have rendered Maryland at its completion one of the most thoroughly surveyed states in the Union and in the possession of a map unexcelled in accuracy and completeness of detail. Before John H. Alexander had reached the age of twenty-one he had conceived the project of carefully examining and surveying the entire territory of the state with a degree of minuteness sufficient to warrant the construction of a map equal to the most detailed products of the larger official organizations. Born in Annapolis, June 26, 1812, and graduating from St. John's College with the highest honors in 1827, Alexander at first undertook the study of law. The suddenly aroused activity in questions of internal improvements, such as the construction of canals, post-roads and railroads, appealed to the student as a line of work full of fruitful possibilities to those fitted for leadership. Accordingly, Alexander gave up the study of law to devote himself to applied science, and became a subordinate assistant in the survey of the Susquehanna, now the Northern Central Railroad. It was during his work on this line that he realized the necessity and value of accurate maps of those areas through which highways were to be constructed. Realizing at the same time that maps alone would not set forth all the facts necessary for the stimulation of immigration and settlement, he united with Professor J. T. Ducatel, professor of chemistry in the Medical Department of the Maryland University, in emphasizing the need of a new map of the state before the Legislative Assembly, with the result that in 1832, upon a resolution of the Legislature, he was appointed with Ducatel to make the necessary preliminary reconnoissance of the state.

This introductory survey resulted in the report on the "Projected Survey of the State of Maryland," published in Annapolis in 1834, which was accompanied by the map of the state of Maryland repre-

senting the most reliable data which could be collected by Alexander and Ducatel. This first work had for its aim "a general reconnoissance of the entire territory of the state with a view of the proper arrangement for subsequent Topographic and Geologic examination, and, inquiry after, and collection of all such authentic information, contained in maps or charts, as covers any part of the said territory of Maryland." The reconnoissance consisted of visits to the chief towns in each of the counties and the examination of a few of the more important and noticeable features of the state. The time occupied was a little over three months. A catalogue was prepared of all the maps regarded at the time as authorities, which was deposited with the librarian of the state. This, however, cannot be found in the library at Annapolis at the present time. The enumeration of charts and maps numbers over sixty, since map No. 63 is taken as one of the authorities for the preliminary draft accompanying the report. The first map of the state prepared by Alexander accompanying the report already referred to is a small black and white drawing of the territory included between the Atlantic ocean and the western boundary. It shows evidence of familiarity with the local features and presents many improvements regarding individual outlines. There are, however, numerous minor distortions in the coast line, and likewise in the outline of some of the streams, which are sketched with considerable accuracy. The numbers of the names on the map are evenly distributed, and as much effort was made, apparently, to attain their uniform distribution as to bring out the location of the more important towns of the state. Among these names may be noticed occasionally a difference in spelling from that in vogue at the present time, as "Emmettburg" instead of Emmitsburg. This map, which is 13.7 by 7.6, is approximately on the scale of 18 miles to an inch. Judging from the text, the map published is the reduction of a larger map made on the scale of 1:200,000 and is based upon observations of latitude and longitude in Baltimore and Washington and on the following pre-existing maps. "The portion of territory, eastward of the meridian, passing between these places, has been laid down from Mr. Lucas' chart; a work published not very long since,

upon data and calculations which are near approximations of those used in the present instance. Westward of this meridian, the course of the Potomac was found in Map No. 63 of the table; and actual survey of the Board of Internal Improvement. This line in default of astronomical observations has been used for defining the western boundary of the state. Still further west, the map of Virginia has furnished the Geography of the country adjacent to the South Branch of the Potomac." On the surface of the manuscript map were also drawn contour lines 100 feet apart vertically, and a number of profiles which were drawn on the same horizontal scale as that of the map with a vertical proportion on the scale of 1:40,000. The statistical columns which accompany this map may be the same as those published in the small sketch in the report, but the text seems to indicate that more facts were collected on the manuscript than are published on the map which has come down to us.

During the summer of 1834 Alexander seems to have been occupied for a very long field season as the topographic engineer for a commission appointed to survey the sounds lying on the Eastern Shore of Virginia, Maryland, and Delaware,[1] and to ascertain the distance between Cape Charles and Cape Henlopen on the eastern or seaward side of the peninsula. The work was conducted from carefully measured base on Smith's Island in coöperation with the U. S. Coast and Geodetic Survey, according to the mode of procedure laid down by the latter organization. The plan of coöperation seems to have called for a primary triangulation by the Federal bureau, and a complete filling in of the secondary and tertiary triangulation by Alexander and his party. The degree of detail sought by Alexander would have rendered any specific survey for local internal improvements unnecessary, thereby saving to the state in the course of years immense sums of money. The prosecution of this work led to the preparation of six maps enumerated by Alexander in the report on the "New Map of Maryland, 1835," page 5, as follows:

"1. A chart of the headlands between Chincoteague inlet and Fenwick's island: the one point being somewhat below the stone between

[1] Report of Progress of the Survey of the Sounds lying on the Eastern Shore of Virginia, Maryland and Delaware. Annapolis, 1834. 23 pp.

the northern line of Virginia—the other containing a boundary stone between Maryland and Delaware. 2. A map of the line run to ascertain the direction of the Canal in the neighborhood of Berlin—from Ayres Mill, at the head of Trap creek, to the head of Herring creek. 3. A map of the location of the Canal from Assawoman, across Turkey Branch creek to White's creek in the state of Delaware. 4. A map of the location from Rehoboth bay, at Warren's creek, to Woolff's branch of Lewes creek. 5. The profiles of the several lines and locations. 6. The Project of the triangles to be made use of in the survey of Rehoboth bay."

Besides these maps, which so far as can be learned are no longer in existence, Alexander prepared others representing the location proposed for the canal between the Choptank and Blackwater, the results of a survey of the Piscataway creek and the proposed drainage of Zakia Swamp, or Allen's Fresh Canal; a plan of a portion of the triangles of the Western Shore of Maryland, and two maps of southeastern and southern Maryland which have been preserved in the reports published for that year. The first three maps are drawn on large scale and really represent little more than carefully constructed meanders and sketches of the bottom land and slopes of the valleys through which the streams surveyed flow. The method of representation is in black and white, with the different hills drawn in delicate hachures with a considerable degree of accuracy. The streams also are sketched and the limits of the marsh lands often meandered.

The map representing the triangulation of the western shore of the bay is of interest in showing the location points for what was "almost the only survey and, it is believed, the first in the United States, based upon the proper principles and conducted by a skilled and scientific observer." The degree of accuracy sought was within the limit of error of one-fortieth of a foot. More than 60 stations are represented, and the work here indicated was probably the basis of all the maps constructed prior to the careful work of the Coast and Geodetic Survey, and even later beyond the limits of the latter's work. There are indications that a line of tertiary triangulation was conducted along certain of the waterways, especially in the vicinity of Baltimore.

The size and shape of these maps have already been indicated in the list published in the first volume of these reports.

The two remaining maps published with the report for 1835 and described as "Map A" and "Map B" are of particular interest, since they represent a marked increase in the knowledge of the topographic features of the state and give the first accurate delineation of the surface of the country at a distance from the shore line which had been made in any detail. Map A is a black and white sketch 23 by 15 inches in size, drawn on the scale of 1:211,200, and includes *all the territory of the state between the Choptank, Chesapeake* and the Atlantic ocean, or the area now occupied by Worcester, Somerset, Wicomico and Dorchester counties. According to the description in the text, "Besides containing the positions of the various places, the course of the streams, &c., and the geological indications, which speak for, and explain themselves; the Map A contains also an elucidation of the topographical features of the country. There has been introduced into this, with as much general accuracy as possible, the system of horizontal planes, indicative of precise differences of level, as well as exhibiting to an eye but a little familiarized the contour and relief of the ground." At first glance the aims enumerated seem accomplished and the impression is left that this is a map possessing accuracy sufficient for all future cartographic representation, since few maps in America are made on a contour interval of less than ten feet. A close examination of the map, and a comparison with the work accomplished in later years, shows that this impression is quite erroneous. Instead of this map showing accuracy of detail normally to be expected with four-foot contours, it is full of distortions, not of a simple sort, east and west, north and south, but in different directions in different portions of the map. The more marked distortion arises, however, from a tendency toward elongation in an east and west direction. This is specially emphasized also by a straightening of the coast lines, which run in a west-southwesterly direction to a due west course—a distortion which is well shown at the mouth of the Monie river, where the north shore of the Jericho marshes is so straight that the southern shore of Dames Quarter has

been distorted to the northeast in order to represent the impression received of the Monie estuary. Not only is there a distortion in the distribution of the points and in the general shape of the coast, but there is likewise a marked lack of detail, or else arbitrary generalization, in the sketch of the shore line. This is carried so far that many of the medium-sized estuaries are completely lacking or are merged into a single bay, in some instances are entirely replaced by land eight or ten feet high, and, in the case of Fish creek, one of the smaller streams emptying into the Pocomoke sound, the sketching of the rivers is poor in direction for the scale of the map, and is lacking in expression, the courses being generalized in almost diagrammatic manner. A third error noticeable in the map is in the platting of the contours, which seems to disregard in great measure any difference between the low marsh lands along the shore and the bench of firm land lying often several miles from the actual water-line. While an appreciation of the difficulties encountered and a consideration of the pioneer character of the work are borne in mind, it is also necessary to realize that these maps are not satisfactory as a basis for cartographic representation. In many features, notably the distortion, this map is far the inferior of the two maps published fully a century earlier. The chief increase of knowledge gained from the sketch by Alexander lies in the triangulation and increased detail along the eastern side of the peninsula, especially on Chincoteague Bay, and in the contours which indicate the first attempt at an accurate representation of the surface configuration of Maryland territory.

Scattered over the surface of the map are terms indicating something of the geological constitution and mineral wealth of the territory. Among the more important deposits, judging from this map, are bog ore and trap, which now are recognized as boulders brought down by the waters and ice from the northern portions of the state. The additional facts regarding the distribution and character of the soils render this one of the earliest agricultural maps published in the country and perhaps in the world.

"Map B," or "a geological map of the counties of St. Mary, Charles, and a part of Prince George on the western shore," which

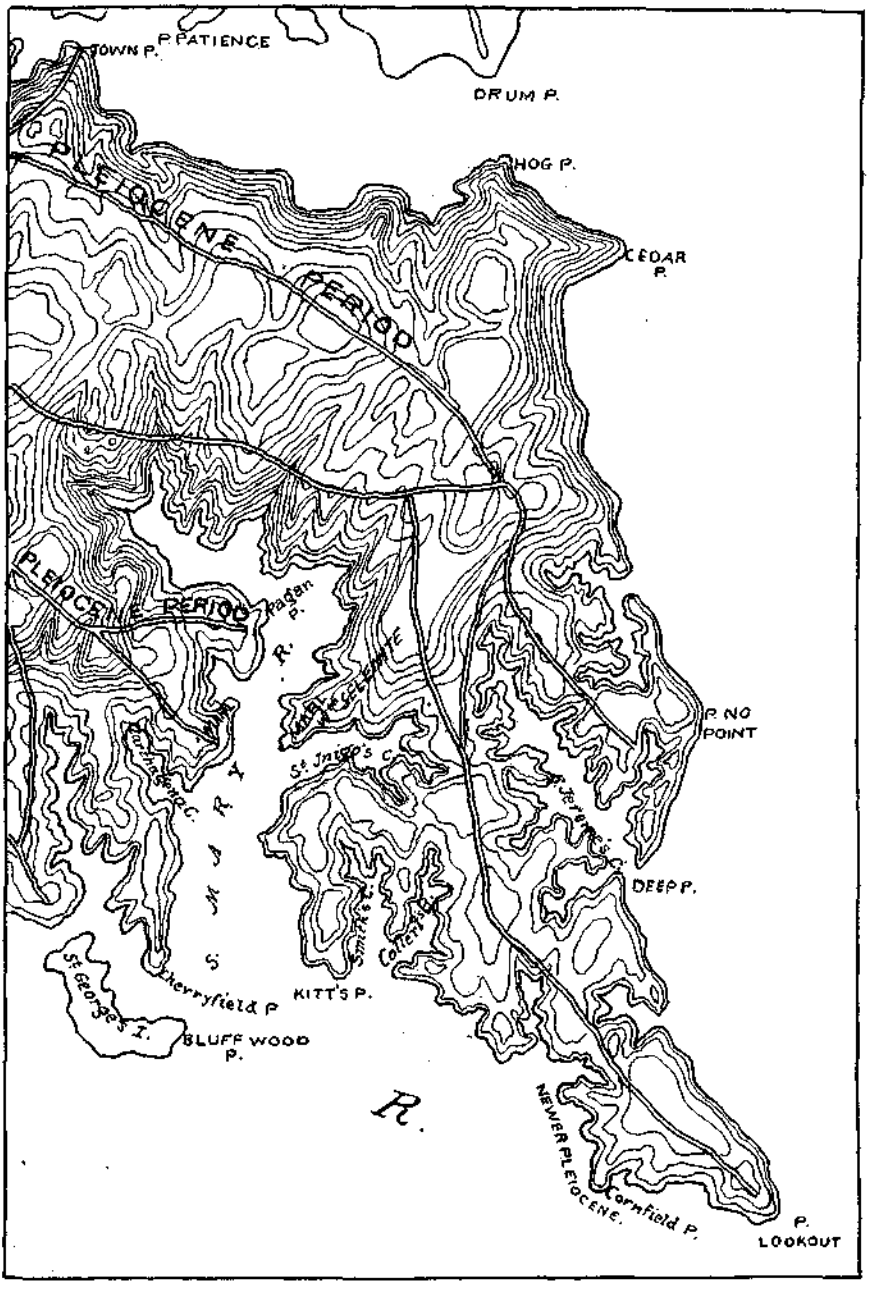


FIG. 38.—Section from Alexander's Map of Southern Maryland, 1835.

is reproduced in part as Figure 33, is drawn on somewhat larger scale (1:200,000) with a contour interval of ten feet. This map shows errors in construction similar to those noted in the preceding one, but here, instead of an elongation in an east and west direction, there seems to be something of an inclination to shortening. There is a similar disregard of the lowlands near the shore, since the slope is represented as almost uniform in gradient from the water-line to the higher elevation, although occasionally an attempt is made to represent benches in the slope. This map is richer in geological detail than any preceding map of the territory, and there is an evident attempt to correlate the formations and to establish their position in the geological column. Remarks are also made regarding their character. In order that the increased amount of detail should not lessen the clearness of the map, the geological and topographical information was printed in two different colors upon the same sheet. This is regarded as new and an advance in the manner of expressing detailed information.[1]

The first two years of the state survey were occupied almost entirely in the prosecution of local surveys in considerable detail. Alexander records, in his report for 1837, the fact that upwards of 200 miles of actual location were made and that maps and estimates upon that length were constructed by himself and a single assistant. The cause for such a diversion of activity from the trigonometric survey of the state was the inability and tardiness of the U. S. Coast Survey to push forward the primary triangulation essential to any undistorted mapping. These location surveys furnished Alexander with very detailed information in certain portions of the state which he attempted to connect by preliminary reconnoissances over the intervening area. The combination of this general detailed work found expression in a series of maps published in the annual reports. These were accompanied by profiles and traverses representing more detailed information concerning certain localities.

The most prominent of these general maps published prior to 1837 are a topographic map of Calvert and parts of Anne Arundel, Prince

[1] The lithographic work was done by A. Schwanecker, 57 Water St. (Baltimore?).

George's, Charles, and St. Mary's counties contiguous to the Potomac; a topographic map of that portion of the semi-bituminous coal region now known as the George's Creek Coal Field, and a topographic map of the country along the eastern base of South or Catoctin Mountain from Frederick to the Pennsylvania line. These maps are all drawn in hachure and have, across their base, information regarding the soil, the geological formations, the fossils, the mine openings and in some instances the exposures observed. The first map, that of Calvert county, is a clear hachured map on the scale of 1:150000 or 0.4224 inches per mile. This was a continuation of the map published in the report for 1836 but cannot be connected with that since it differs from it in scale and in style, the former being in contours, the latter in hachures. The territory mapped extends from Drum Point up either side of the Patuxent and along the Chesapeake to the Magothy river. The general outline of the shores and banks of the river is only moderately accurate considering the scale of the map. The same weakness noticed in preceding maps is evident still. There is a lack of appreciation of topographic forms and the appearance of the sketch is hard and somewhat diagrammatic. It is somewhat difficult to determine the amount of information used in sketching this map, for the hachures apparently are not applied with uniformity and the valleys and slopes are frequently generalized, or misinterpreted, in trend and elevation. In these respects the work of 1836-37 is inferior to that accomplished in the earlier years of the survey. Scattered over this map is detailed information in the form of remarks indicating the character of the soils and the location of fossil deposits, amber and lignite. Although inferior in type to some of the previous work and far inferior to the later work, this represents the best expression of the topographic work of the interior portions of Calvert county prior to the preparation of the sheets made by the present U. S. Geological Survey.

The second map of the report for 1836 is a small lithographic sheet covering the territory between Savage Mountain and Dan's Mountain from the Mason and Dixon line to Elk-Lick river, West Virginia. This represents the results of a plane table and trigonometric survey

of the region undertaken in the spring of 1837 at the personal expense of Mr. Alexander, who had become interested in the development of the coal deposits of this area. From the information on the map and in the text it is impossible to determine how accurately this survey was made. Since the elevations of the openings of the principal mines are given with their location, the first impression received regarding the map is that it is one of considerable accuracy. A closer study, however, and a comparison with the latest cartographic representations show that in many of its features this earlier sketch is far from correct. Although drawn on the scale of 1:84480, the actual amount of work upon which it is based seems to be a rough traverse over a few of the streams, notably George's creek itself, and sketching from certain plane table stations. The map shows errors in the direction of the streams and their intersections with one another, as well as in the actual drainage systems. Even the National road is not accurately represented, and the majority of the smaller streams seem to be generalized, or drawn somewhat arbitrarily in their courses. The greatest weakness in the map seems to arise from careless drafting. The streams sometimes stop or are disconnected midway in their course, and frequently the hachuring is so indefinite that it is impossible, at first sight, to determine where these omitted streams should flow. The most pronounced errors are along the borders of the map. Near the northern boundary and on the slopes of Savage Mountain and Dan's Mountain the detail is less than along the valley of George's creek, which is somewhat more accurate. Another criticism which should be considered is that in Alexander's representation of altitudes by hachures there is no constancy in the value of his shading, so that some of the eastern portions of the state seem more rugged and mountainous than the territory represented in the present sketch. The same criticism seems to hold even within the limits of a single map, so that little information may be gained beyond the impression of the general nature of the surface. This map of Alexander's has been used as the basis of many of the maps of the George's Creek Coal Basin, which have been so frequently published by the different coal operators in the region. With the

opening up of the country, and the increased facilities for mapping, there has gradually been introduced into this earlier hachured sketch more and more accuracy until at the present time the representations used are fairly correct, although the trend of the mountains is too nearly north and south.

The third general map published by the state engineer during the years 1836-37 represents the material gathered in three preliminary surveys for the location of a railroad from Frederick northward through the Frederick valley to the Pennsylvania line. During the work in this region three trial lines were surveyed, one half-way between the Monocacy and the foot of the mountains, a second along the foot of the Catoctin Mountain, and the third along the banks of the Monocacy. Thus, for a certain distance on each side of these lines, the topography is compiled from measurements or minute estimates; the rest was taken from the best maps obtainable and checked by a general reconnoissance of the entire region. This map seems to be the most accurately platted of any of the maps prepared by Alexander up to this time. The territory covered is included between the western bank of the Monocacy, the foot of the Catoctin Mountain, Frederick and the Pennsylvania line. The only map available at the present time, of sufficient accuracy to warrant a comparison of the expressions of the topography, is that published by the Western Maryland Railroad from data obtained by the U. S. Coast and Geodetic Survey. Compared with this map the Alexander sketch seems to be more accurate in the lowlands along the Monocacy and less detailed along the foot-hills of the mountains. On the whole, the Alexander map expresses more, with greater accuracy, than any other map of the region which is now obtainable. The county maps, which will be considered in a later portion of this paper, show more roads and houses but fail to represent the surface of the country.

When the work was completed at the end of 1837, Alexander presented his resignation on the ground that the original intention of the act of 1834, establishing the Geological and Topographical Survey, had been practically nullified by the many local bills introduced in the subsequent legislatures compelling the topographical engineer to

conduct many small location surveys for canals and railroads. The formation of a complete well-established map of the state seems to have passed from the minds of the legislators in their eagerness to gain the services of a skilled engineer at the low figure of $2000 a year and no expenses. This resignation was accepted, and all the cartographic work done in the remaining years of the Survey's existence was through the generosity of Alexander, who prepared the maps for his former colleague without expense to the state. With the severance of the connection between the state and the topographical engineer, the official preparation of a state map apparently ceased. Whatever work was done after that time was done entirely by Alexander, at his own expense, as he found time from his other duties. The plan which had been inaugurated in the earlier years of the Survey by which succeeding annual reports were accompanied by topographic-geologic maps of one or more portions of the state was continued, but the type of maps produced rapidly changed. Prior to 1837 there had been no unity either in the type of maps or the scales on which they were made. Subsequent to this time, with a single exception, the scale adopted was 1:200000, and the style of representation remained approximately constant. The earlier maps showed attempts at representing the surface with four-foot contours, ten-foot contours, or hachures of varying value. The report of 1837 by Ducatel, which dealt with the geology of Kent, Cecil, and Montgomery counties, was accompanied by two of the later type maps. The first, covering the area of Kent and Cecil counties, was drawn with hachures on the scale of 1:150000 and shows an increased accuracy in the representation of the coast-line and an effort to represent the differences between the topography of the Coastal Plain and that of the harder rocks to the north. This map remained the best delineation of the country prior to the work of the present State Geological Survey in the preparation of its Elkton sheet. The system of sketching in this map is intermediate between that of the preexisting ones and that of those sheets which followed in the subsequent reports of Ducatel. The system of drainage in the area seems to have been from the standpoint of certain elevations rather than

that of the drainage-lines, the result is that the map is dotted with a series of conical hills of more or less uniform height representing in their distribution the appearance of an area of volcanic cones, similar to that of central France. Over the surface are notes indicating the location of fossil beds and the character of the rocks forming the principal ridges of the region.

The second map of the 1837 report is of Montgomery county embracing the territory between Sugar Loaf Mountain and Ridgeville on the west, and Georgetown or Bladensburg on the south. The scale is 1:200000. The style of hachuring is improved, since there seems to be an evident effort to have the degree of shading correspond approximately to the elevation of the country represented. The ridges lose much of their detail especially along their tops by the printing of geological information in place of the hachures. The notes distributed in this way over the map are intended to supply whatever knowledge has been gained regarding the general composition of the ridge to which they are attached. Although by far the most carefully executed of the maps constructed by Alexander at this time, Ducatel speaks of it as lacking in detail and having less actual information as its basis than is the case with any of the previously mentioned maps.

No maps accompanied the report for 1838, but in 1839 the plan adopted in 1837 was carried out more fully by two maps which complete the representation of all the north-central portion of the state from Harper's Ferry to the Delaware line. This information is represented in two maps: the first, of Frederick and portions of Carroll counties, embraces the territory from Westminster to Harper's Ferry. This is on the scale of 1:200000, and shows a higher grade of skill in hachuring than has heretofore been evident. This may perhaps be cited as an illustration of the highest grade of mapping produced by Alexander. The hachures are arranged with considerable care, and there is a suggestion of underlying contours, thus expressing with greater accuracy the surface configuration. There is a return in the method of portraying the geological information to that used in 1835 but in an improved form, since the colored type used in the latter

instance is of a more neutral tone which, while sufficiently distinct, does not mar so much the unity of the map.

The second sheet in this report for 1839 embraces all of the territory between the Susquehanna and Westminster, *i. e.* Harford and Baltimore counties with parts of Carroll county. This is entirely in harmony with the maps of Montgomery county already discussed, so that there was prepared by Alexander a continuous sketch of the territory from the Susquehanna to the Hagerstown valley, on the scale of 1:200000. This latest sheet differs from the preceding ones by having indicated upon it the locations of the more important triangulation stations. There is also some indication of the ore pits of the region which have been of some economic importance.

The report for 1840 was the last one given by Ducatel as geologist of the state. The difficulties of the position and the friction between local interests had rendered the office of State Geologist so obnoxious to some of the people that it was deemed wise to abolish it even before the completion of the final report on which Ducatel based the permanency and the character of his reputation as a scientific worker. Much of the last year's work by the State Geologist seems to have been carried on through the liberality of persons outside the state who had become interested in the coal deposits of Allegany county, which had been developed through the activity of the Geological Survey. The former topographical engineer had already become interested in the problems of this region, and together Alexander and Ducatel prepared the first accurate representation of the region embraced within Washington, Allegany, and Garrett counties in a map entitled "Map illustrative of Allegany and Washington counties." This sheet, which is 16.5 by 6.8 inches in size, is drawn on the scale of 1:400000, and embraces all the territory between the Blue Ridge and the western boundary of the state. The representation of Washington county seems to be little more than a sketch of the territory as seen from the National road combined with the information concerning the course of the Potomac given in such maps as that by Fry and Jefferson and the drafts of the engineers of the Chesapeake and Ohio Canal. There is of course a marked increase in the accuracy

of the sinuosities of the Potomac, but even in this sketch there are frequent bends which are either distorted or contrary to the actual facts in nature. Allegany county, which then included both Allegany and Garrett, is much more accurately drawn, and the general trend of the mountains is very sharply brought out by the somewhat diagrammatic hachuring of the map. The drafting of the minor details, especially about George's creek, closely follows that of 1836. The errors noticed in the latter map have in almost all instances been perpetuated, but the scale has been so greatly reduced that they are no longer so evident as in the first instance.

Although the official representatives of the people seem to have lost all interest in the preparation of a map of the state, this aim had constantly remained before the former topographical engineer who, in 1840, brought out somewhat officially and yet apparently at his own expense, a large manuscript map of the entire state on a scale of 1:200000. This map is 79 by 41 inches in size and is contoured east of the Monocacy with fifty-foot contours and west of the same stream with one hundred-foot contours. It is entitled "1840 Geological Map of Maryland in which are also shown the chief topographic features to aid in the Triangulation under the direction of J. H. Alexander, Engineer of the State." It is not known how many copies were originally prepared, but there must have been at least two. One, which was deposited in the library at Annapolis on its completion in December, 1840, has long since disappeared from the archives, leaving no trace as to its final disposition. A second copy has been preserved by the family of the original draftsman and is now in the possession of his son, J. J. Alexander. From this copy Mr. Bates of the U. S. Coast Survey, at the instance of General Scott, made an exact tracing in 1861. This is still preserved in the War Department at Washington, and from it the State Geological Survey has received photographic prints on the original scale. The description of the map is based upon such prints, and the accompanying plate, which is taken from one of the earlier maps, illustrates the general type of Alexander's work.

According to the legend on the original map, the material employed in its compilation is as follows:

The published & MS. paper of Mason and Dixon,
Surveys of the Chesapeake and Ohio Canal,
" in Chesapeake Bay by H. B. M. officers, 1774, 1781,
" by Capt. Brantz and Lt. Sherburne,
Special surveys of U. S. War Department,
Surveys by a Commission from the States of Delaware, Maryland and Virginia.
Survey of the Eastern Shore Railroad,
" New Castle and Frenchtown Railroad,
" Chesapeake and Delaware Canal,
" Philadelphia and Wilmington Railroad,
" Tidewater Canal,
" Canal from Baltimore to Havre de Grace.
" Baltimore and Port Deposit Railroad,
" Water supply for Baltimore,
" Baltimore and Susquehanna Railroad,
" Reisterstown turnpike Road,
" Baltimore and Ohio Railroad,
" Washington Branch Railroad,
" Annapolis and Elkridge Railroad,
" Maryland Canal (proposed),
" Cumberland Turnpike,
" Susquehanna River by Hauducœur,
Special surveys by Engineer of the State.
" The enumeration above covers all published and MS information existing up to the date of compilation, Octr.-Decr., 1840."

The greatest stress seems to have been laid in all instances, as was natural, on Alexander's own work, for it was found on comparison with the single sheets, already published by the state in the various geological reports previously enumerated that there is a great similarity in the sketching between that of the earlier maps and this larger complete drawing of the entire state. The latter shows a repetition of many of the errors already noticed in the smaller maps, although there is no evidence of tracing or mechanical reproduction of the earlier results. Instead, the whole map seems to have been redrawn, for the points and re-entrants along the coast show differences in detail from any preceding map. These are such as might arise from a somewhat hasty copying of the earlier sketches. The information represented in earlier maps on different scales has been reduced to uniformity, and wherever the sketching was formerly in hachure, it has been changed to contours of the intervals already cited. When one realizes that this is almost, if not quite, the first detailed contoured map of an entire state ever made in America, that

the Baltimore and Ohio Railroad extended only to Martinsburg, that many of the other railroads had not been thought of, and that several of the turnpikes radiating from the larger towns were still features of the future, one must regard this map of Alexander's as a pioneer work of the highest type which should have received from the state that it represents the fullest recognition. The breadth of view shown in the original plans proposed for the new map of Maryland and the high standard of accuracy established, together with the helpful coöperation promised from the U. S. Coast and Geodetic Survey, if accepted by the state at that time, would have placed Maryland in the foremost rank of those commonwealths which appreciate the value of an intimate knowledge of their resources and the generous patronage of educational forces at work within the state. Unfortunately, through the seeming neglect of possibly a few officials, almost every trace of the early work of both Ducatel and Alexander has been destroyed, so that at the present time there is scarcely a complete set of maps and reports in the possession of any state, public or private library.

The Maps of the Boundary Controversies.

Few, if any, of the states composing the Union have had more earnest or more protracted struggles regarding territorial limits than Maryland. They began with the settlement of the first colony on the Potomac and have, in a single instance, still to reach their conclusion. In every case Maryland has come off the loser. Beginning with all the area between the Potomac and the fortieth parallel of north latitude, there have been successively taken from her the greater portion of Delaware, the southern part of Pennsylvania, and several counties of what is now West Virginia. The controversies, which have sometimes led to border warfare, and often to the miscarriage of justice, may be grouped as those of the Northern Boundary, the Southern Boundary, and the Western Boundary. These controversies have given rise to a voluminous literature, but it is apropos at this point to give only summary reviews of them, since each has brought into prominence otherwise insignificant maps, or caused surveys which have furnished some of the most detailed maps of Maryland territory yet constructed.

THE NORTHERN AND EASTERN BOUNDARY.

The *Northern Boundary* troubles include also those of the Eastern Shore along the borders of Delaware. The first grant given by Charles I to the First Lord Baltimore presented the territory from the Potomac to the 40th parallel of north latitude provided it was still uninhabited. This limiting proviso ("hactenus inculta") has been the cause of most of the misunderstandings. Prior to the Baltimore grant, a few Dutch settlers lived for a short time along the Delaware, and somewhat later the Swedes made a permanent settlement on the western shore of that bay. Neither nation possessed the land by right of discovery, and their possessions were ultimately acquired by the Duke of York, who sold his claim on the western shore of the bay and river to William Penn in 1682. The latter's title was immediately disputed, and the Duke of York, then James II, ordered a decree of his Council in 1685 to the effect "that for avoiding further differences, the tract of land lying between the Bay of Delaware and the eastern sea on the one side, and the Chesapeake Bay on the other, be divided into equal parts by a line from the latitude of Cape Henlopen to the fortieth degree of north latitude, the southern boundary of Pennsylvania by charter, . . . and that half thereof lying toward the Bay of Delaware and the eastern sea, be adjudged to belong to his majesty, and the other half to the Lord Baltimore, as comprised in his charter." Since this decree was retroactive and established Penn's title there was little for the Proprietor of Maryland to do. From their relation to this decree two maps are of particular interest in elucidating its terms. The first is by Visscher and the second by Smith.

Justin Winsor[1] gives this note concerning the former: "In the Ellis sale, London, Nov., 1885, No. 232 was a map Novi Belgii; Novaeque Angliae [etc] by Nicholas Visscher (Amsterdam about 1651) which had belonged to William Penn and was indorsed by him, 'The map by which the Privy Council, 1685, settled the bounds between Lord Baltimore and I, and Maryland, Pennsylvania and Territorys or annexed Countys—W. P.'"

[1] Nar. and Crit. Hist., vol. v, p. 272.

"A correct copy and imitation" of an edition of this map, published in 1659, was republished [in London?] in 1833. It is a sheet 21.5 by 18.2 inches, colored and ornamented by a picture of the village at New York, drawn by Augustine Herman. The scale is about seven and a half German miles to an inch. If this copy is like the sheet to which Penn attached his note it sets at rest forever the calumnies against him in which he is charged with wilfully misrepresenting Cape Henlopen in the more southerly position. The date of publication given by Winsor indicates that he thought the original was drawn while Penn was a boy less than ten years old. The locus of our present Cape Henlopen on this map is called "C. Carnelius," while "C. Hinlopen" is attached to some point farther south (Fenwick Island). The whole representation of Maryland is directly taken from Smith's map, but the cartographic work is not as detailed and accurate.

The second map, that by Smith, was wrong in placing the 40th parallel so far south that there would be an unallotted strip between that parallel and the southern limit of Pennsylvania if that was placed twenty miles north of New Castle.

This ambiguity, together with the doubtful nature of the "middle point" of the peninsula and the location of Cape Henlopen, allowed latitude for disputes which continued until May 10th, 1732, when Charles (Fifth Lord Baltimore), and the sons of William Penn agreed "that a semi-circle should be drawn at twelve English Statute miles around New Castle, agreeable to the deed of the Duke of York to William Penn in 1682; that an east and west line should be drawn, beginning at Cape Henlopen—which was admitted to be below Cape Cornelius [the present Cape Henlopen]—and running westward to the exact middle of the Peninsula, between the two Bays of Chesapeake and Delaware, and the ends of the line intersecting it in the latitude of Cape Henlopen, a line should be run northward, so as to form a tangent with the periphery of the semi-circle at New Castle, drawn with the radius of twelve English statute miles, such a line should take a due north course or not; that after the said northwardly line should touch the New Castle semi-circle, it should

be run further northward until it reached the same latitude as fifteen English statute miles due south of the most southern part of the city of Philadelphia; that from the northern point of such line, a due west line should be run at least for the present, across the Susquehanna river, and twenty-five miles beyond it,—and to the western limits of Pennsylvania when occasion and the improvements of the country should require; that that part of the due west line not actually run, though imaginary, should be considered to be the true boundary of Maryland and Pennsylvania." The distance north from New Castle according to this agreement was reduced from twenty to twelve miles, and the artifice of a semi-circle was devised to overcome the difficulty suggested by Smith's erroneous locations. The map by which this second agreement was illustrated was constructed by the famous mapmaker and publisher, John Senex, and the circumstances surrounding its preparation are given in the Penn Breviate drawn up for the Chancery proceedings of 1750-1. The defendants between August 16th, 1731, and May 10th, 1732, carried the map to Senex, who engraved it and was paid for it by the two parties to the proceedings. In May, 1732, the draft of the agreement was redelivered to the complainants' solicitors to be engraved. Six several parts were immediately engrossed on parchment with the defendants' map impressed in the margin thereof.[1] All six copies were completed by May 10th, and ten days later Thomas Penn embarked for Pennsylvania with the agreement while a copy was also sent to the Deputy-Governor of Maryland.[2]

[1] A free expansion of the abbreviated statement by Penn in Pa. Arch. 2nd Ser., vol. vii, pp. 301-400. Papers relating to the Boundary Dispute between Pennsylvania and Maryland, 1734-1760.

[2] Four copies of the manuscript maps referred to are now in the library of the Maryland Historical Society. They show the general outline of the bay and its tributary drainage for some distance up the Susquehanna river. The names of the streams are given, and in general, these conform with the usage of the present time. The boundary lines separating the present territories of Maryland, Delaware and Pennsylvania are laid down in red. The personal copy belonging to Lord Baltimore had lines laid down in ink and numerous notes regarding the location of unmentioned streams and certain tracts of land. From a cartographic standpoint these maps are far below the standard of the best contemporaneous work. The map referred to in the discussion of Lewis Evans' map, p. 396, has not been seen.

By this time the Baltimores realized that a loss of territory was a foregone conclusion, and there was apparently inaugurated a consistent series of efforts to delay the final settlement by the use of the most trivial means, which continued until the final settlement of the question. The first line actually run (1739) was made under the terms of the temporary agreement of 1737, by which the line east of the Susquehanna was fifteen miles and a quarter south of Philadelphia and only fourteen miles and three-quarters on the west side of the same river. This "temporary line" extended as far west as "the westernmost of the Kittochtining Hills" [*i. e.* near Hancock?], but was not sanctioned by Maryland west of the Susquehanna. The Penns finally took the whole matter into Chancery, where the Lord Chancellor in 1750 and 1751 directed that new commissioners be appointed; that the centre of the circle be at the centre of New Castle; that Cape Henlopen be at Fenwick's Island (fifteen miles south of the present Cape Henlopen); and that the miles measured should be horizontal and not according to the inequalities of the surface. The work of this commission was commenced in 1752, but new troubles arose which were not quieted until another commission was appointed to run the lines agreed upon. The work of the surveyors employed was difficult and slow, and little more than the southern line of Delaware and the radius from New Castle had been determined when the disputants hired Charles Mason and Jeremiah Dixon to complete the work.

These eminent surveyors, who had such problems to solve as the running of a circular line through a forest and the measurement of a degree of latitude in a wilderness, arrived in Philadelphia in November, 1763, and were duly commissioned for their task by the 9th of December of the same year. The fulfillment of the conditions of their contract occupied them a little less than four years, for the line so far as surveyed was certified to be marked November 9th, 1768, and the surveyors were honorably discharged on the 26th of December following.

So far as known, no map was published [1] as the direct result of their

[1] Large maps were, however, prepared by the Commissioners, and two copies are now in the possession of the Maryland Historical Society. These

labors, but their field-notes abound in detailed comments concerning the country surveyed. The expense of their work was met jointly by the Proprietors of Maryland and Pennsylvania, the latter paying £34,200 in colonial currency as his share. The accuracy of the work is attested by the fact that Col. Graham's survey in 1849-'50 did not show two inches of deviation to the right or left of the centre of the post at the end of the due north line.

This survey by Col. Graham was conducted by a full corps of assistant engineers and such men for field service as were required by him. The work was conducted by means of chain and transit, and was finally checked by theodolite and chronometer. The topography was noted and offsets were measured at all houses, fences, streams and other remarkable objects within a reasonable distance of the lines. This survey, which was inaugurated because of the discrepancies between the plattings of the north-south line and the northeast corner, resulted in a report by Col. Graham, which was accompanied by a small map illustrating the general location of the points under discussion. No additional information concerning the territory was incorporated in this map.

THE SOUTHERN BOUNDARY.

The southern boundary troubles began almost upon the arrival of Lord Baltimore's colony at St. Mary's in 1634, but no actual determinations in the field were made until 1668, although during the occupancy of Kent Island by William Claiborne he was instructed to make a map of the region indicating the territory in dispute. So

bear the title "A plan of the Boundary Lines between the Province of Maryland and the Three Lower Counties on Delaware with Part of the Parallel of Latitude which is the boundary between the province of Maryland and Pennsylvania." The sheets, which are 75x26 inches large, include pen drawings of the territory on either side of the north and south, and east and west lines on the scale of 4¾ miles to an inch. The territory depicted is a belt about seven miles wide along the entire length of the boundary of Maryland. In this little strip are represented the houses, drainage, roads and mountains, as well as the more prominent points of the line. The latter are given in red. Beside this delineation of the territory traversed is an agreement signed and sealed by five commissioners from each state.

far as is known this map is not now in existence, and no evidence has been found to indicate that Claiborne carried out the instructions given him. In 1663 the trouble over the boundary between Maryland and Virginia on the Eastern Shore became more acute, and letters were frequently interchanged between the governors of the two colonies. Nothing, however, was accomplished until the date mentioned above (1668), when Edmund Scarbrough, Surveyor-General of Virginia, on the part of Virginia, and Philip Calvert, Chancellor of Maryland, on the part of Maryland, were appointed to meet at Watkins' Point and run a divisional line to the ocean. This they accomplished, and on June 25th, 1668, they signed an agreement regarding the location of Watkins' Point and the line which they had run according to instructions. It is not known that these surveyors actually prepared a map for publication indicating the physical features on either side of their line. Since the date of their agreement, however, several maps have been published indicating where this line was established. The most prominent of these was that by John de la Camp, entitled "Southern Boundary of Maryland between Smith's Point and the Atlantic Laid down in conformity with the agreement made June 25, 1668. Between Phillip Calvert, Chancellor of Maryland and Edmund Scarbrugh, Surveyor Gen[l] of Virginia. . . ." This sheet, which is 30.5 by 10.7 inches in size, is compiled from the original maps of the survey made in 1858 by Lieut. Michler, U. S. Topographical Engineer, and from maps and other data obtained from the office of the U. S. Coast Survey. The scale of the map is 1:128000. It was published to illustrate a paper on the "Southern Boundary of Maryland" by Thomas G. Lee.

The discovery of valuable beds of oysters in Pocomoke Sound, which in later years have proved to be causes of dispute, made the question of jurisdiction dependent upon the location of the state boundary the subject of needed settlement. Several attempts were made by Virginia and Maryland to find some common ground upon which they could agree regarding the location of the line separating Somerset county, Maryland, and Accomac county, Virginia. It was not until 1858 that commissioners were appointed to obtain, in addi-

tion to the evidence already at hand, the best local information by an actual survey of the vicinity of the boundary. The work of surveying for this commission was done by Lieut. Michler, U. S. Corps of Engineers, who made a minute survey of the whole boundary, preparatory to the final location of such lines as might be agreed upon. Michler's work was incorporated in a map of fifteen sheets 44 inches in length by 21.25 inches wide. A set of these maps was prepared in duplicate for deposit with the land offices in Richmond and Annapolis.

With the outbreak of the war the question of the southern boundary remained unsettled and was not finally determined[1] until 1873-'74, when a final award was given determining the location of the boundary between Maryland and Virginia from Smith's Point across Smith's Island and Tangier Sound through Pocomoke Bay to the beginning of the old Calvert-Scarbrough line. No new map resulted at the final settlement of this controversy, as the line agreed upon was platted upon the charts of the U. S. Coast Survey embracing that territory. Such copies certified by the governors or commissioners of the interested states were deposited in the various public libraries for reference. One may be seen in the Peabody Library at Baltimore.

The controversy regarding the location of the southern boundary, while resulting in the preparation of but two or three maps of the region, has been of marked influence on the cartographic knowledge of the state. Through it the Herman map was rediscovered and republished, and many points regarding the preparation and publication of early colonial maps were first brought out in the endeavor to interpret the terms of the original agreements. No other subject has caused such an extensive searching of the documents relating to Maryland now deposited in Europe and America.[2]

[1] Even at the present time there are special committees appointed to investigate and report upon any modifications or changes that may be desirable in the boundary line between the states of Virginia and Maryland.

[2] A discussion of the question and the maps relating to it may be found in the following papers:

Jones, Isaac D. Report of the Commissioners appointed by the Legislatures of Maryland and Virginia to run and mark the Division Line between

WESTERN BOUNDARY.

Unlike the controversies relating to the northern boundary of the state, that concerning the western boundary has been little influenced by delineations of the territory in existing maps. In the same way, while the northern boundary resulted in no maps giving the details accruing from the survey of the line, the western boundary survey included a study of the surface configuration of the country passed over and an incorporation of the results into a map which has remained since its completion the most authentic picture of the territory traversed.

The historical and legal problems relating to the western boundary have been so clearly set forth in the papers of the Maryland Historical Society and the brief prepared for the suit against West Virginia that little needs to be recalled in this connection. The earliest controversies regarding the location of this western line resulted, as already shown, in the Cresap map; while the Mayo map, or that of the Northern Neck, delimiting the possessions of Lord Fairfax, introduced certain geographic points which have remained in the controversy ever since. Subsequent to the Revolution, Deakins made a survey of a portion of the country adjacent to the western boundary in order that he might lay off the grants of land given to the soldiers. He took pains, however, to embrace no land within the disputed zone. His work resulted in a map,[1] little more than a

Maryland and Virginia, on the Eastern Shore of Chesapeake Bay. Annapolis, 1868, 36 pp.

Lee, Thos. J. Southern Boundary of Maryland, 1860.

McDonald, A. Extract from the report of Col. A. McDonald in March, 1861, to the Governor of Virginia, [etc.] Md. Senate and House Documents, 1872, W.

Wise, Henry A., et al. Report and accompanying documents of the Virginia Commissioners appointed to ascertain the Boundary Line between Maryland and Virginia. Richmond, 1873. 146 pp. Appendix 314 pp. Atlas.

Anon. Final Reports of the Virginia Commissioners on the Maryland and Virginia Boundary to the Governor of Virginia. Richmond, 1874, 221 pp.

Jones, I. D. Report and Journal of Proceedings of the Joint Commissioners to Adjust the Boundary Line of the States of Maryland and Virginia. Annapolis, 1874. Md. House Doc., 1874 J; Senate Doc. E.

[1] This map bears the title "Map Military Lots, tracts, etc. Westward of Fort Cumberland—Awarded Officers and Soldiers of Maryland Line for

land plat, and a boundary line which has been one of the elements in the boundary disputes. This map is deposited in the Land Office and, so far as known, has never been published.

The work conducted under the joint commission appointed for Maryland in 1852 and Virginia in 1858 by Lieutenant N. Michler, U. S. Topographical Engineers, resulted in the first detailed map of the region. The work under Lieut. Michler was carried on with the assistance of John de la Camp and L. Daser during the seasons of 1859 and 1860, and the map resulting from the work was drawn by de la Camp in 1868. This cartographic work was originally prepared in the form of eight large sheets, on the scale of 1:12000, which were deposited among the archives of the states in the controversy. The map in its published form, however, did not appear until the beginning of the present suit. The printed sheet is approximately 40 inches long and 10 inches wide, and the territory represented is a strip on either side of the Michler line varying in width from 3 to 9 miles. The style of mapping is with hachures, and the scale adopted is 1:60000, or 5000 feet to the inch. The region represented extends north and south from the Fairfax stone to the Mason and Dixon line.

The recent survey establishing the Brown-Bauer line has developed several new facts regarding the territory surveyed. This work has shown that the head of the Potomac is not at the Fairfax stone, where the spring is intermittent, but at the head of Laurel Run in Potomac Spring. This latter point is 125 feet higher in altitude than the Fairfax stone and is within 300 feet in distance of the crest of the Big Backbone Mountain, a portion of the main divide between the waters running into the Atlantic and into the Gulf of Mexico. Assuming the Potomac Spring as a starting point, the territory traversed by the line of 1897 is west of that represented in the Michler or de la Camp map just described. No published map has appeared incorporating the newly acquired information, but a manuscript has been prepared for use in court which shows in detail all of the claims

Services During the Revolution—4165 Lots—50 acres each. By Francis Deakins, Appointed under a resolution passed by Gen'l Assembly in 1787." The sheet is 59 inches long by 71.5 inches wide.

of the contesting states. The size of this sheet is approximately 15 feet in length or about 6 inches to a mile. The actual surveying represented in this new map includes a complete survey of all the streams at the head of the north branch of the Potomac and a sketching of the territory along either side of the line by the engineer in charge, W. McCulloh Brown. At the same time Dr. L. A. Bauer was assigned the verification of the Michler meridian line, which started at the Fairfax stone, the determination and tracing of a new meridian line starting at the Potomac stone, and the determination of the magnetic elements at as many points as possible along the line of survey. The work by Dr. Bauer was carried out between August 16 and October 16, 1897, under the direction of the Maryland Geological Survey, with the coöperation of the U. S. Coast and Geodetic Survey.

The County Atlases.

Partially as the result of personal interest, and partially because of the information acquired by the work of Alexander, the local surveyors in various portions of the state began about 1855 to meet the demands for county atlases which would give in considerable detail the election districts, roads, houses, drainage and other features of interest within their immediate neighborhood. All of these county atlases are of approximately the same character as that represented in Fig. 34, which is a photographic reproduction without color, of one of the county maps by Hopkins published in 1878. None of the various atlases attempt to express with accuracy the surface configuration of the regions depicted. The engineers devoted almost their entire attention to the location of the roads and a few of the houses of greater importance. Hachures were occasionally used to roughly represent the more rugged portion of the region. The election districts are usually distinguished from one another by differences in color, and the drainage is sketched with some accuracy adjacent to the roads traversed. All of the work seems to have been done by the use of buggy- or wheelbarrow-odometers. For this character of work the maps are above the average in accuracy.

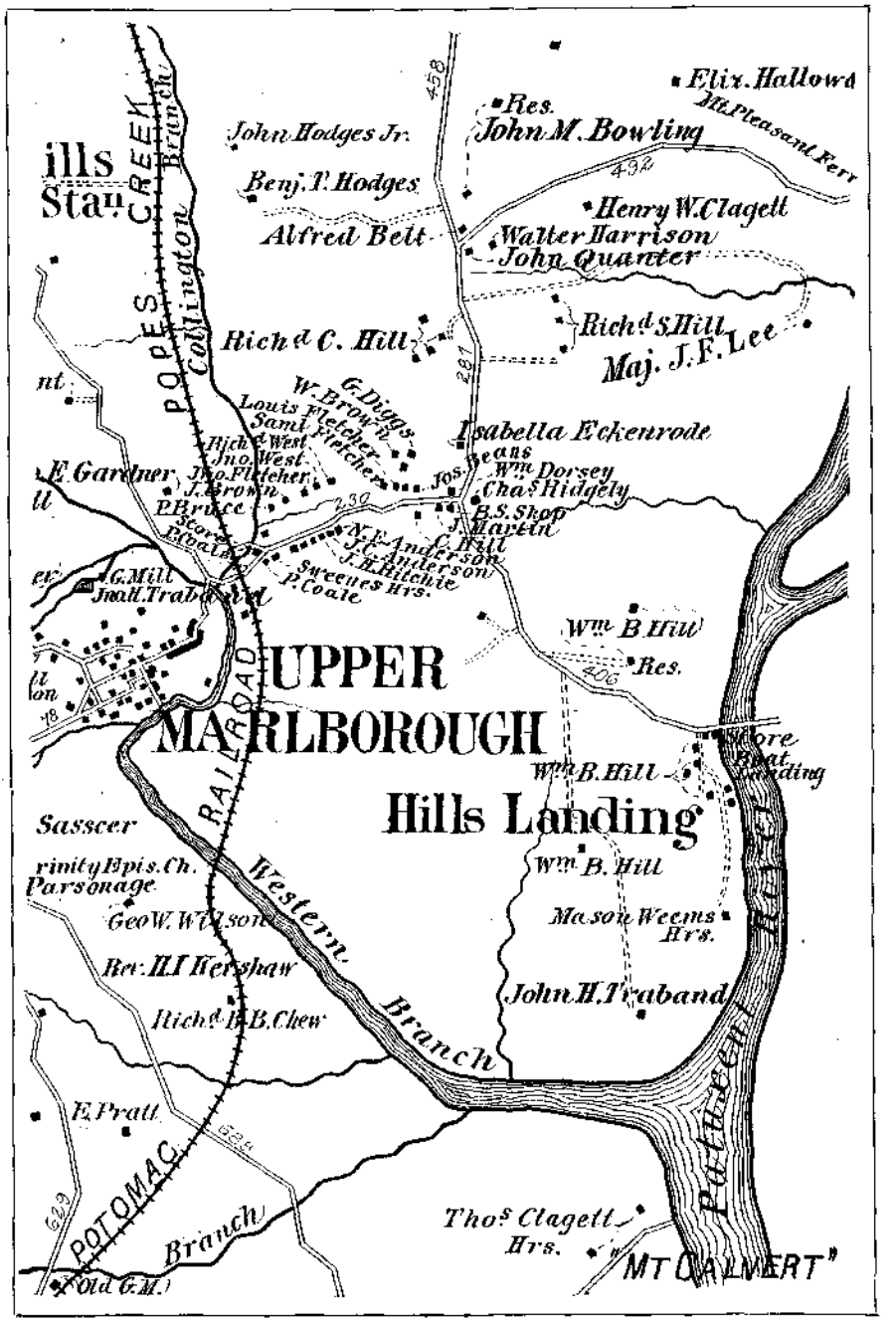


FIG. 34.—Section from a county atlas, 1878.

MARTENET'S ATLASES.

The foremost engineer in the preparation of these county atlases of the entire state was the late Simon J. Martenet, for many years the City Surveyor of Baltimore. During the financial crisis of 1857, when his business had somewhat fallen off in the general depression of that period, to fill up his time he commenced the survey of Cecil county with the design of making a map of the same which should be only one of many representing the counties of the state. These he hoped to combine, ultimately, into a large map of the entire state. Prior to the war he had completed surveys and maps of Cecil, Howard, Kent, Anne Arundel and Prince George's counties, and had commenced the work in several others. Subsequent to the war, the work was taken up anew and maps were made of Carroll and Harford counties. The remaining counties of the state were also surveyed for the purposes of the state map. No individual atlases were prepared of the western counties because of the lack of demand immediately subsequent to the war. In all, it is estimated that approximately 15,000 miles were traversed for the state map, which remains to-day the best authority on several parts of the state. It is also the best single map in print.

In order that the large map above mentioned might be completed, Martenet introduced a bill into the Legislature of 1865 praying for assistance in its publication. According to the records, no amount is stated in the bill, which was finally passed during the last hours of the session. The financial aid of greatest value to the publication of this map was obtained about ten years later, when another bill was passed which authorized Martenet to supply copies of his map to each of the counties as official maps of the state, and the superintendents of the schools to furnish only the Martenet map to county schools making requisitions for a state map. This bill immediately introduced a considerable demand for sheets, which were sold at the rate of $7 apiece.

Although all of the various Martenet maps are published without individualizing the names of the surveyors active in their preparation, it is certain that few, if any except Cecil county, were prepared by

S. J. Martenet himself. Carroll and Anne Arundel counties were surveyed by his brother, George W. Martenet; Queen Anne's and Worcester by J. R. Rhodes; Montgomery by Shipley; and the other counties by various assistants. The rate of work done in these county surveys is not definitely known, since the field-notes are not dated from day to day; but it seems probable from information at hand that the average distance traversed per day was approximately ten miles.

The maps and atlases published by S. J. Martenet himself are as follows:

Cecil county, 1858. This is a wall map with the roads drawn in outline on the scale of 1½ inches to a mile. The total size of the sheet is 41 by 41. At present the map is out of print and copies are very scarce.

Anne Arundel county, 1860.

Howard county, 1860. This sheet is drawn on the same scale as that for Cecil county, and is of the same general character. It is a wall map, 53 by 32 inches in size.

Kent county, 1860. This map was prepared by Mr. Baker, County Surveyor of Kent, and published by Martenet. This sheet is on the scale of a mile to an inch, and is like the preceding in character. It forms a wall map 32 by 35 inches.

Carroll county, 1862. The scale of this wall map is approximately two-thirds of a mile to an inch and forms a sheet 44 by 52 inches in size.

[*Allegany and Garrett counties, 1864.*] A map bearing this title was drawn in manuscript on the scale of approximately four-fifths of a mile to an inch, but was never published. This is a portion of the material which was prepared for the completion of the state map.

Montgomery county, 1865. This is drawn on the scale of a mile to the inch and is 35 by 30 inches in size.

Wicomico, Somerset, and Worcester counties, 1877. This map is drawn on a smaller scale than the preceding (3 miles to an inch), and serves more as an index map to the numerous larger scaled sheets of the different election districts which it accompanies in atlas

form. The size of the sheet is somewhat over 12 by 14 inches. With the atlas are twenty-seven smaller maps ranging in scale from 3 inches to a mile to one-half an inch to a mile, the average being about one and a half inches to a mile.

Harford county, 1878. This sheet is very much like the map of Cecil county. It is drawn on the same scale and, like the latter, is very rarely met with.

[*Frederick county, 1880?*] A manuscript map which apparently served as a base for a county map for Frederick county is deposited in the library of the American Geographical Society. There is, however, no record of the publication of such a map by Martenet. It is drawn on the scale of 2 miles to an inch, the drainage is blue, the roads are in red, and the railroads in black.

The State. The first Martenet map of the state in its entirety was published in 1865 in four sheets, 36 by 21 inches in size, on a scale of 1:221760, or 3.5 miles to an inch. This map was roughly hachured and conforms almost wholly to the lines laid down in the sheets now on sale by the S. J. Martenet Company. During the same year atlas and wall editions of the state map were published on the scale of 1:950400, or approximately 15 miles to an inch. This base is the one which has served for the map of Maryland in many of the atlases published in subsequent years. Later editions of the larger and smaller scaled maps were published in 1885. These are apparently from the same stone, somewhat corrected and brought up to date by the introduction of new roads and additional cultural lines. At the present time the larger map is issued in several forms. It has been printed as a single sheet with or without colors and in three overlapping sheets embracing respectively the eastern, central, and western portions of the state. No improvements have been made in this map since 1885, as the stones have been lost through fire. The field-notes also and the original drafts are in some instances misplaced.

Although the Martenet maps have been somewhat severely criticised because of the inaccuracies in the textural description of the boundary lines as well as in the location of a few points, the sheet

shows the result of conscientious work in the compilation of the information acquired. There are of course many errors in the sheet arising from the way in which the surveying was done, and there are others the result of somewhat careless sketching. For example, in the most of the county atlases, as well as in several instances in the state map, the streams are made to rise within the area delineated, although they may have entered the county or state from some outside source. The sheets, however, are richer in local names and in certain features of local detail than any other maps of the state.

OTHER ATLASES.

Other atlases than those by Martenet have been published, notably by Martenet, Walling and Gray, by George M. Hopkins, and by Lake, Griffing, and Stevenson. In many instances these maps are simply reproductions of Martenet's work with the author's consent. Frequently they were published on a royalty. The Hopkins atlases include a map of the state in 1877 on the scale of 1:506886, or approximately 8 miles to an inch; an atlas of Baltimore county, as well as of Baltimore and vicinity in the same year. An atlas of 15 miles around Washington, including portions of Prince George's, Montgomery, and Fairfax counties; and another of 15 miles around Baltimore, including portions of Anne Arundel, Howard, and Baltimore counties were published in 1878. The latter appeared in at least two forms; the first to attract the inhabitants of Howard county, and the second those of Anne Arundel county. Each atlas, however, has the same maps, which are on scales varying from an inch to a mile to 3 inches to a mile. The Lake, Griffing and Stevenson work includes atlases of Kent and Queen Anne's counties, of Cecil, of Talbot and Dorchester, of Washington, and of Carroll counties. All of these were published in 1877 and are composed of outline maps of the different counties usually on the scale of 2 miles to an inch with many maps of election districts on much larger scales. There are from 15 to 30 of these larger maps in each of the atlases enumerated.

Besides the work of Martenet and the atlases by map publishers enumerated above, there appeared from time to time single counties usually in the form of wall maps. The earliest of these is of Fred-

erick county by Isaac Bond. It is on the scale of 1 mile to an inch and is 34 by 44 inches in size. A year later a map of Talbot county was published by W. H. Dilworth, and one of Washington county was prepared by Thomas Taggart. The latter is an outline road map for the wall on the scale of 2 inches to a mile. It is a sheet 51 by 68 inches. In 1873 an atlas of Frederick county, prepared by J. D. Luke, was published by C. A. Titus & Company of Philadelphia. In the same year a map of Caroline county made by John B. Isler was copyrighted, but this did not appear in published form until 1875. It is on the scale of 1.62 inches to a mile and represents the roads and the drainage districts. It is a sheet 61 by 37 inches. A map of Queen Anne's county by Strong is mentioned by Williams in his list of Maryland maps. This has not been seen.

The Cartographic Work of the United States Coast and Geodetic Survey.

The early history of the organization which, finally, has become the U. S. Coast and Geodetic Survey, shows many difficulties overcome, and a broad outline of work laid out and partially accomplished prior to work within the state of Maryland. Established by act of Congress in 1807, and subsequently suspended in 1818, the real work of the present organization did not begin until 1832, and it was not until eleven years later that the surveying of Chesapeake Bay and its tributaries was commenced.

Mr. J. H. Alexander, soon after his appointment as Topographical Engineer in 1833, endeavored to secure the coöperation of Professor Hassler, the first Superintendent of the Coast Survey, in order that he might have an accurate primary triangulation upon which to base his topography. This effort unfortunately proved unsuccessful because the Maryland committee was not ready to perform its part in compliance with the agreement adopted.

The work, according to the general plan of the Coast Survey, which included the major and minor triangulation, topography and hydrography of all the lands and waters seen by mariners sailing along the coast or in the navigable estuaries, was commenced in the vicinity of New York, and already in 1842 had been pushed across New Jersey

to the Delaware. The extension of the triangulation from this point to the Potomac during the season of 1843 was the first systematic work conducted within the present borders of the state and marks the beginning of operations which have been carried on almost continuously ever since. The following year it was found necessary to verify this primary triangulation by the introduction of a second base line, measured on the western shore of Kent Island, lying not far from the centre of the tidewater portion of the state.

TOPOGRAPHY.

Work was immediately commenced on the topographic mapping, and before the end of the season seven manuscript sheets were completed on the scale of 1:10000, which embraced most of the shore line from Annapolis to Baltimore, including two sheets devoted to the Severn river. While work was being prosecuted on this part of the bay shore line, another party was engaged in surveying the course of the North East river. The work in this area, however, was not completed until the succeeding year.

The summer following (1845) was devoted to the upper portion of Chesapeake Bay, especially along the shores of Baltimore, Harford and Cecil counties between Bohemia river and Baltimore. Although the work was not completed over the entire region, the main outlines of the coast line were platted and detailed surveys were made of the Susquehanna between Spesutie Narrows and Port Deposit and of the mouth of the Magothy river. The work already undertaken was pushed forward with energy until at the opening of the season of 1847 the shores of the bay north of a line connecting Point Thomas on the Western Shore and Kent Island on the Eastern Shore had been carefully drawn either on the scale of 1:10000 or 1:20000 of nature. From this point the topographic work was extended southward until it included the Pocomoke and Point Lookout in 1851, while the work already commenced on the small strip of Maryland bordered by the Atlantic reached its completion in 1850. Thus it is seen that the U. S. Coast and Geodetic Survey with increased facilities for transportation, improved instruments and the results of all previous work for initial knowledge, employed seven years in its

first survey of a portion of the territory which Smith represented with tolerable accuracy after a single month's exploration of unknown shores in an open boat under trying circumstances. In these two instances the work is utterly different in character, and the comparison is not a disparagement, but rather a commendation for both.

The operation of the Federal organization between 1851 and the outbreak of the war, as conducted within the state of Maryland, consisted of revising, and, in several cases, resurveying certain of the more prominent waterways along which there were plans for making improvements. In this way manuscript sheets were prepared of the Patapsco (1851-54), the Sassafras (1854), the Bohemia and the South rivers (1855), and Chincoteague Bay (1857).

The Potomac and Patuxent rivers were the last features in Maryland to receive detailed mapping, although topographic sheets containing the mouths of both of these waterways had been prepared in 1848 and 1849. The survey of the Patuxent was extended to Lower Marlboro in 1860, but the mapping of the Potomac was not completed until two or three years later. Although the work about St. Mary's and St. George's was well under way in 1859, the greater portion of the Potomac was surveyed in 1862, when sheets were prepared embracing the Potomac from Blackistone Island to Fort Washington. During the year following, the survey was continued from Broad creek (opposite Alexandria) to Little Falls, but it was not until the close of the year 1866 that the field work was completed for sheets covering the valley of the Potomac from its mouth to a point opposite Shepherdstown, West Virginia.

HYDROGRAPHY.

The topographic mapping was accompanied, or immediately followed, by a study of the character and form of the bed of Chesapeake Bay and its tributaries. The investigations conducted have extended through most of the field seasons from 1844 to the present time (1897), but certain years are marked by increased activity within the borders of the state. The years 1844-'48, 1862, 1866, 1869-'70 and 1876-'77 are the periods of important surveys. During the first four years of operation in the state, hydrographic sheets were pre-

pared covering almost the entire shore line of the Chesapeake Bay with the exception of the indented estuaries between Watkins' Point and the mouth of the Nanticoke, which were studied until the seasons of 1858 and 1859. The season of 1862 was devoted to a study of the Potomac, and that of 1866 to the Patapsco. With the opening of the season of 1869 work was commenced on the estuaries and smaller streams of the Eastern Shore. This was conducted so successfully that by the close of 1871 manuscripts had been prepared representing in detail the stream beds of the Pocomoke, Chester, Choptank and Sassafras rivers to the head of navigation in each. During 1876-'77 a detailed resurvey of Baltimore harbor was made, which resulted in the preparation of five sheets of wharf, pier and shore line maps, which include full hydrographic details. In the years intervening between those already mentioned, work was not suspended within the state, for the average annual output was about three manuscript maps.

Very few of the topographic and hydrographic sheets referred to in the foregoing discussion have been published, but the data which they contain are combined in a series of 15 charts on different scales which are obtainable[1] from the proper authorities.

Since the charts of the Coast Survey are constructed primarily as an aid for seamen, the topography seldom extends more than two or three miles inward from the shore line. Frequently the limit is the first road running parallel to the coast. Wherever the topography is delineated hachures are used, while the trees, houses, cultivated fields, swamps and property lines are represented by conventional signs. The line between the land and water at mean low tide is carefully outlined, while the character of the bottom is described as "hard,"

[1] A list of these charts giving the character, scale, size, date of publication and price, together with directions for their procurement is given in Volume I of the Maryland Geological Survey Reports, p. 138. Plate IV of the same volume represents graphically the territory included within the boundaries of each chart. Detailed information concerning the men engaged in the surveys, the time employed, the baseline measurements, the stations utilized as triangulation points or occupied for the determination of astronomical position, gravity or magnetic force are given in the same volume, pp. 115-125.

"soft," "sticky," "rock," etc. The depth of the water is also given in fathoms and feet. Along the shore, where the water is less than 18 feet (3 fathoms) deep, the shape of subaqueous surface is indicated with three grades of shading, one for each fathom, the heaviest near the shore. By this means it becomes easy to distinguish the shape, extent and character of the shoals at a glance. Besides the various soundings, there are scattered over the charts concise statements regarding the rise and fall of tides, sailing courses and bearings, latitude and longitude of given points, the location and description of buoys, lighthouses and lightships, and the magnetic variation for the sheet.

The charts, engraved on copper, are perhaps the most accurate delineations of extensive portions of the country which have been made, and their authoritative statements are of especial interest to Maryland. The extension of the Chesapeake Bay across almost the entire state from north to south renders the miles of shore line (2800) relatively high for the area (12,210 square miles), and the information collected by the members of the Federal organization especially valuable to the citizens in the tidewater portions of the state.

The preparation of maps of detailed accuracy is an expensive operation, as shown by the following estimates made by Gen. Comstock [1] (I) on the work from 1858-1872 [2] and by Gen. Wheeler at the time of the Venice Congress (II),

	I.	II
Cost of triangulation per square inch.....	$ 25	$120
Cost of topography per square inch.....	333	403
Cost of hydrography per square inch.....	93	80
Cost of surveying per square inch.....	426	483

These estimates are the most accurate that have been published, and show that though the amount expended for triangulation is decreasing, that for topography and hydrography remains about the same. The rate per square inch is not excessive for good work, but is far in advance of any sum available from state treasuries.

[1] Senate Ex. Doc., 45th Cong., 3rd Sess., No. 212, January 30, 1879.
[2] House Ex. Doc., 48th Cong., 2nd Sess., No. 270, p. 533. Dec. 10, 1883.

The Cartographic Work of the U. S. Geological Survey.

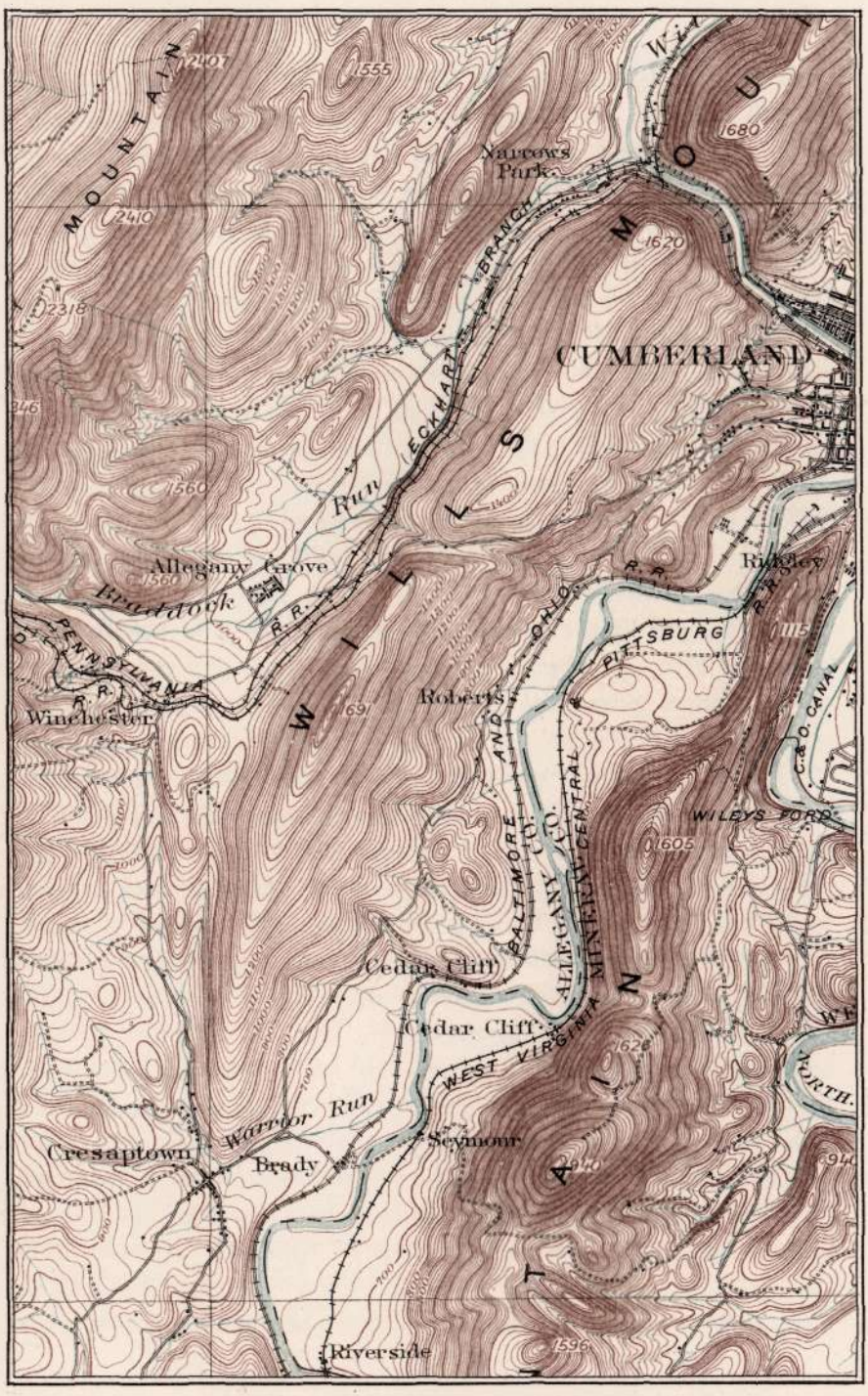
Prior to the consolidation of the different geological surveys of the United States into the present organization, the U. S. Coast and Geodetic Survey had commenced a triangulation across the continent to connect its stations on the seacoasts of the Atlantic and the Pacific. When it was seen that the intervening territory was to be mapped in an adequate manner by another official bureau, the Coast and Geodetic Survey relinquished a portion of its plans of operation to the latter organization. In the state of Maryland, before the inception of the work by the topographers of the Geological Survey, considerable work had been done by the Coast Survey, as indicated in the preceding pages, which has proved of considerable value. There were established several points of major triangulation, as, for example, at Sugar Loaf and Maryland Heights. The coast line of the Potomac and the Chesapeake had also been carefully platted so that much of the work was in a fair state for immediate utilization. The Coast and Geodetic Survey also furnished its manuscript data to the Department of the Interior, as desired, thereby decreasing the amount of time and the expense in the preparation of new sheets. The style of work accomplished by the Coast Survey was such that intervening territory between the Potomac and Chesapeake needed to be surveyed in some detail. West of Washington a topographic map had been made on the scale of 1:125000 with one hundred-foot contours.

With this large amount of initial information regarding the domain to be surveyed, work was inaugurated in the western portion of the state in 1883, when a party early in July entered the field at Cumberland. The methods introduced by the Geological Survey differed somewhat from those of the Coast Survey, and followed the lines as laid down in the preceding paper by Mr. Gannett. After the triangulation of the territory has been established for control, the topography is mapped by means of traverses, lines of travel, and also by plane table and contour sketching. Subordinate secondary and tertiary triangulation is used to establish control points for the topography. Starting out with a new corps of men, the work at first was necessarily slow and considerable attention was paid to the compilation of preëxisting cartographic information.

The original plans of the U. S. Geological Survey contemplated the preparation of a map on a scale of 1:250000, or about 4 miles to an inch, with contours at intervals of 100 feet. Later this scale was replaced by that of 1:125000, or about 2 miles to an inch, and for several years was continued upon the latter basis. When the mapping of the region was carried into the low-lying, but intricate, topography of the Coastal Plain, where the country is more thickly populated, the scale of 1:62500, or about 1 mile to an inch, was adopted. This scale has, however, been abandoned in the final publication of the maps south of the parallel 39° 30′ N. latitude. The successive shifting of scales, together with the inexperience and haste of the earlier surveyors, has required several revisions of portions of the state before accurate maps have resulted. These revisions will be more evident from the following discussion of the work upon the individual quadrangles.

The number of sheets, including Maryland territory prepared, and in many cases engraved and published by the U. S. Geological Survey, amounts to thirteen, on the scale of 1:125000 of nature, and twenty-seven on 1:62500. Many of these were made under such different conditions that they are no longer regarded as equal to the standard now adopted for the topographic maps constructed at the present time. Some of them have never been engraved, but the manuscript data are available for the preparation of sheets to represent the territory included.

Beginning work in the western portion of the state in 1883, a party consisting of three or four topographers was kept in the field during the seasons following until the close of 1886, when most of the territory north and west of Washington had been surveyed with varying accuracy. The first year's work, west of Cumberland, was for publication on the scale of 1:250000, or four miles to an inch. This scale, however, was changed the following year, and the work already accomplished was redrawn to a larger scale. The rate at which this territory was surveyed, 450 to 700 square miles per month for a single party, and the cost per square mile, estimated in 1885 at $3, shows that the amount of work done in the area could not adequately



MAP SHOWING APPALACHIAN TOPOGRAPHY OF ALLEGANY COUNTY.

FROM FROSTBURG SHEET, U. S. G. S.

express the complex topography of the region, although it is true that triangulations previously made by the Coast and Geodetic Survey greatly reduced the expense and time necessary for the work. The United States Geological Survey has never published any maps representing this work, although manuscript copies were prepared and the Piedmont and Romney sheets were engraved in 1887. After the revision of the early work of the Coast and Geodetic Survey in 1885, a map was prepared for the Western Maryland Railroad by Mr. E. H. Fowler, which appeared in two editions, on the scales of approximately 1.5 and 3 miles to an inch. The larger of these sheets is 36 by 30 inches, and the smaller 18 by 15. These give the roads, railroads and drainage, as well as the surface configuration by 100-foot contours, of all the territory from the fortieth parallel to 39° 15′ between Cherry Run and Frederick Junction. The work remains to the present day as the best contour map of the region north of 39° 30′, and in the smaller map is a high grade sheet for its scale. At the same time a much rougher map, with hachures, was prepared for the same company by John Laing, embracing the territory between Sabillasville and Edgemont Station. This map extends north of the state line to Gettysburg Gap.

While this more rapid reconnoissance work was being pushed in the western portion of the state, field work and the compilation of existing data was commenced on the territory immediately surrounding Washington. This ultimately resulted in the East and West Washington sheets, engraved in 1888, on the scale of 1:62500 with 20-foot contours. Much of the country within the limits of the District of Columbia had just been surveyed in considerable detail by the District authorities, and the Coast and Geodetic Survey had made a manuscript map on the Maryland side of the Potomac river to Great Falls, including a zone of country three miles in width. The work for these sheets was conducted by means of stadia and plane tables, based upon the bench marks and triangulation of the Coast and Geodetic Survey. The scale of the sketching was twice that of final publication, or approximately 1:30000. During the succeeding year the Baltimore sheet was made on the scale of 1:62500. This sheet

is based upon the work of the U. S. Coast and Geodetic Survey, and only 178 square miles of the territory were surveyed by the Geological Survey. This was on the scale of 1:40000. The work was done by the plane table and road traverses and stadia observations. In the early portion of 1888 the Frederick quadrangle was surveyed, work being completed in the early August of that year. The territory examined included 400 square miles.

From the information acquired between these years, 1883-'89, six sheets have been retained as sufficiently accurate. These are the East[1] and West Washington, Harper's Ferry, Fredericksburg, Baltimore and Mt. Vernon sheets. The Piedmont and Romney sheets which were first engraved in 1887 were revised in 1894 and 1891 respectively. In 1889-'90, little work was done in the state. The field work in Maryland for the season of 1890 was devoted to the mapping of the entire western shore of Chesapeake Bay, extending northward to the head of the bay and westward to the Mount Vernon and Frederick sheets. Within this territory the Baltimore and East Washington quadrangle had already been surveyed. One topographer, with two assistants, was engaged in this work, embracing 2450 square miles (12 atlas sheets), on the scale of 1:62500, from early June until the middle of December. Thus the territory was mapped in six months at the rate of over 400 miles per month. This apparently rapid work was possible, since the triangulation and coast line of the entire area, together with some of the topography near the water-line, had been secured by the U. S. Coast and Geodetic Survey some 30 and 40 years earlier. The territory surveyed is represented on the following sheets: Annapolis, Baltimore, Brandywine, Drum Point, Ellicott, Laurel, Leonardtown, Montross, Owensville, Piney Point, Point Lookout, Prince Frederick, Relay, Wicomico. The following year the work of surveying the remaining territory on the western shore was completed, furnishing data for the Gunpowder, North Point and Sharps Island. The last sheet, however, was not fully completed until the succeeding year.

The work enumerated above completes that conducted in the state by the topographers of the U. S. Geological Survey prior to the

[1] Portions of the East Washington sheet were resurveyed in 1896.

establishment of the Maryland Geological Survey. When the latter organization commenced its work a plan of coöperation with the national survey was accomplished by which activity in the area was renewed. Agreeably to this arrangement, a large force was placed in the field on the eastern shore of Maryland in May, 1896, which prosecuted the survey so rapidly that by July first, six sheets had been completed for publication, each 15 minutes square. These six, however, are parts of three sheets to be published, on the scale of 1:125000, which will bear the names Tolchester, Choptank and St. Mary's. Much of the information contained on these maps is based upon the work of the U. S. Coast and Geodetic Survey, since they embrace little more than the shore line on either side of the bay.

Later in the same season the remaining territory of the state lying east of Rising Sun and Chestertown was surveyed for publication as the Elkton and Dover sheets. The latter is on the scale of 1:125-000, with 20-foot contours, and represents portions of Cecil, Kent, Queen Anne's and Caroline counties. The former is on the scale of 1:62500, with 20-foot contours, and includes portions of Maryland, Delaware and Pennsylvania. The succeeding season was devoted to the triangulation and mapping of the territory in the western part of the state. At its end the Frostburg quadrangle had been mapped and considerable progress made on the Flintstone quadrangle. During the season of 1898, work has been conducted upon four quadrangles, namely, the Flintstone, Paw Paw, Grantsville and Accident. The Paw Paw sheet includes 140 square miles of Maryland territory, the Flintstone 190, the Grantsville 210, and the Accident 220. In the preparation of these sheets accurate spirit levels were run over several hundreds of miles, and some thousands of linear miles of road were traversed. All of the topography is controlled by adequate triangulation. The difference in the detail and accuracy of these later maps, when compared with those of the first survey of the territory, is shown in the fact that the cost per square mile has increased from $3 to $13.

Upon the topographic sheets of the region already discussed the Federal Government has already published several geological folios representing the results of detailed geological investigations in the

quadrangles delineated. Each folio includes a general introductory sketch concerning the fundamental facts of geology and topographic mapping, a more detailed account of the geological formations found within the quadrangle, and three or more maps representing the topography, the areal geology, and the economic geology of the region. Much of the information included in these sheets has been published in advanced form in scientific magazines, illustrating scientific papers on the problems involved. Many of these preliminary maps are discussed in the subsequent pages. All of the folios embracing territory south of 39° 30′ are on the scale of 1:125000, or approximately 2 miles to an inch. Among those which have already appeared from the government press are the Piedmont, Harper's Ferry, Fredericksburg and Nomini.

Geological Maps.

Among all of the surveys which have served as the foundation for the maps considered in the foregoing discussion, little attention has been given to the collection of geological information. Smith, it is true, collected and sent to England barrels of carefully labeled specimens, among which he hoped skilled chemists might find some ores of value. He thought that among the treasures found were deposits of antimony. There are, however, no indications of his economic proclivities displayed on this map. Later cartographers, such as Griffith or Shriver, have indicated by occasional words the location of ore deposits, but the cartographic representation of the mineral wealth and the geological features belongs to a distinct class of students, who have utilized the maps at hand as bases upon which to record their geological observations. The resulting maps may be considered under four heads, according as the information incorporated treats of Maryland in general terms, as a part of a larger area, or more specifically, as a unit covering a portion or all of the state. Convenience and geological relations suggest a grouping into those dealing with the whole, the Coastal Plain, the Piedmont Plateau, and the Appalachian Region of the state. Deviations from this arrangement, however, are advantageous in the case of men, like Ducatel, who had undertaken a detailed study of the entire state and published in parts.

GEOLOGICAL MAPS OF THE ENTIRE STATE.

General Maps.

The earliest map to correlate the geological formations of Maryland with the divisions already recognized in Europe is the work of William Maclure. This was first prepared in 1809 to accompany a paper of the author's before the American Philosophical Society. Concerning the base used (a map published by Bradley), and the manner of platting his information regarding a portion of Virginia, the author makes the following remarks: "The map of the United States on which those divisions are delineated, though I believe the best yet published, is exceedingly defective in the situation and range of the mountains, courses and windings of rivers, etc., but as the specimens which I collected every half-mile, as well as the boundaries of the different formations, are from the positive situation of the different places, the relative arrangement of the map cannot change them, but must become more exact, as the geographical part is made more accurate." [1]

There seems to be more than one edition of this volume, and in the volume seen the map was missing. The text says that, owing to the absence of the author, a copy of Lewis' map was used.

In the second edition of his paper published in 1817, Maclure used as a base a map published by John Melish, a well-known map publisher of the day. On this base are five or six hand-washed colors representing the various formations. The mapping in Maryland seems to be determined almost wholly from information gained in Virginia and Pennsylvania. The broader divisions, as now recognized, are represented, but the limits of the different formations are inaccurate. All of the Coastal Plain is given as "*Alluvial*," with the exception of a zone of Cretaceous across Cecil county to the head of the Chesapeake, where it stops abruptly. The Piedmont Plateau is "Transition," which extends to the red sandstones of Carroll, Frederick and Montgomery counties. The line between the "Secondary" and the "Primative" runs along the top of the Blue Ridge. West-

[1] Trans. Amer. Philos. Soc. vol. vi, 1809, p. 427.

ward from this formation extends the "Transition," till it is replaced by the Old Red Sandstone in northwestern Garrett county.

Although discrepancies may be easily seen, this map is epoch-making from the marvellous accuracy of its generalizations, which were based on a few scattered and unsystematized observations. The influence of the work was far-reaching; its errors even were reproduced by Lyell (1845) and Marcou (1853), who failed to continue the Cretaceous across from Havre de Grace to Fredericksburg, Virginia. The map by Lyell, prepared after his visit to this country in 1844, is much more detailed than any general map of the United States then published. Twenty colors and several devices were used to distinguish the different formations. The scale, however, is too small to represent all the geological subdivisions of the Appalachians in their many alternations. There are, for this reason, instances where only the top and bottom members of folds are given. While there are many variations from the interpretations now accepted, and in several copies errors in the registration of the hand-laid colors, the whole map in the western portion of the state shows a marked increase in knowledge. This increase in detailed information is due to the personal observations of Lyell in the region about Cumberland, and in the numerous facts gathered during the existence of the State Survey by Ducatel. The most evident errors in the map lie in the locations of the different formations, which are usually too far east, and in the generalized character of the Coastal Plain. The representation of the latter is, however, more detailed than in the map by Maclure.

The map by Marcou (1853) is on so inaccurate a base that the course of the Potomac is generalized, and the Shenandoah does not even connect with it. The locations of geological formations are accordingly lacking in accurate details. Although the map shows an increase in knowledge regarding the southwestern territory of the United States, there is no evident advance in the portrayal of Maryland geology.

During the preparation of the 9th United States Census, Charles H. Hitchcock and W. P. Blake were entrusted with the compilation

of a geological map of the United States. Their labors resulted in a sheet 21 by 33 inches, printed in nine colors, drawn on a scale of 90 miles to an inch. The representation of Maryland is based on Tyson's map, published twelve years earlier, on nearly ten times this scale. This sheet, which was republished several times between its first appearance and 1880, represents the best sketch on the scale until the appearance of the sheets, prepared under the direction of W J McGee, which accompany the 5th and 14th Ann. Repts. U. S. Geol. Survey in 1885 and 1894.

The Ducatel Maps, 1834-1840.

The greatest advance in the information concerning the distribution of the geological formations throughout the state recorded on maps between 1817 and 1859 is on the maps constructed by the State Geologist, J. T. Ducatel, on base maps furnished by the State Topographical Engineer, J. H. Alexander. At first this information consisted of scattered facts indicating the location of ore pits and fossil deposits, but as the work progressed westward into the southern counties of the western shore there was a manifest attempt at correlating the clays and sands there found with certain of the broader geological divisions, such as the Upper and Lower Pleiocene. Occasionally, also, according to the maps and text, there is a suggested correlation between the greenish sands and marls of Maryland and the better known "green sands" of New Jersey. Maps in still later reports show an effort to designate the constitution of individual ridges in the Piedmont region, but the distribution of facts placed on the maps does not indicate anything of the geological structure of the area. There is a suggestion of the general trend of the formations passing in a northeasterly-southwesterly direction across the state. In all of the maps furnished by this survey, numbering eight or ten, there was no effort made to distinguish the different formations by colors. On the contrary, with two exceptions, all of the information is in type of the same color as the general map. Where this is not so the change in color is given to all of the geological information to avoid confusion through too great detail. That this method is the result of predetermination may easily be seen from the text which

the map accompanies, for the State Geologist constantly held before himself the hope of ultimately preparing a complete final report which would give a comprehensive discussion of the entire physiographic, geologic, and economic aspects of the state. This end was never accomplished, and all the scientific data which had been reserved for this final volume were lost through the abandonment of the survey just prior to its logical completion. This hasty termination of a bureau which had proved itself helpful to the agricultural and mining communities deprived the state of a scientific position which it could have acquired with almost no additional expense beyond the publication of the mass of facts which had been already accumulated.

The Tyson Map, 1859.

The preparation of a geological map such as Ducatel had in mind was actually accomplished by Philip T. Tyson for his report published in 1860. Mr. Tyson had long been interested in the mineralogical and geological features of the state, so that this map, though published in his first report, is based on a large amount of slowly and carefully acquired information. The work is of especial interest and value upon several grounds. It is the first detailed geological map of the entire state, and its representation of the geological formations is by far the most complete which had been attempted up to that time. The twenty-four colors and patterns employed are printed from stone and not hand-laid, as in most of the previous instances. It is accompanied by profiles, giving the first complete diagrammatic indications of the geological structure across the state from Laurel Hill in Garrett county to Bodkin Point; from Washington to St. Georges Island; and from the Mason and Dixon line to Pocomoke Bay. This map is 25.5 by 13.4 inches, and is drawn on the scale of 9.75 [1] miles to an inch on a base compiled by Mr. August Faul from all the available data. The streams are clearly drawn, and their names, together with the names of towns, are given in considerable abundance. The courses given, however, are in

[1] Through some oversight this was given as 12 miles to an inch in vol. i, p. 68.

many instances poorly or inaccurately drawn. For example, the Octorora is given as a small creek rising within the limits of the state, while the Deer and the Gunpowder are made to head south of the Mason and Dixon line.

Considering the areal distribution of the different geological formations, one is struck immediately with the rounded, indefinite character of the boundaries laid down, especially in the Piedmont Plateau. Here there seem to be many points indicating that Tyson was not familiar with the extent and distribution of certain of the formations. For example, the serpentine of Broad creek in Harford county is represented as a single small mass lying south of the creek, while masses of similar rock about White Hall and Hereford are indicated as much larger than found at present. Other variations from present day interpretation may be seen in the boundaries between the Cretaceous and Tertiary in Anne Arundel county, or between the Tertiary and post-Tertiary of Dorchester county. Similar differences may be detected in the mapping of the western counties. In spite, however, of all the criticisms which may be made on the details, the map represents a marked improvement over all preëxisting attempts at representing the geology of the state, and shows such a great increase in knowledge that it has remained the best authority on the territory involved up to the beginning of the present decade. Even now it is not surpassed by more than two or three published maps of the territory, and these have utilized all of the accurate information of the Tyson map.

The Williams Map, 1893.

The largest geological map of the state is the result of the combined work of several observers, notably N. H. Darton, G. H. Williams, A. Keith, H. R. Geiger, P. T. Tyson, and I. C. White, under the editorship of G. H. Williams. It bears the title "A preliminary Geological Map of Maryland," and appeared as one of the illustrations in "Maryland; its Resources, Industries and Institutions," which was prepared for the "Board of World's Fair Managers of Maryland" in 1893.

This map, which is approximately 30 by 18 inches, is laid down

upon a new base which was prepared especially for this work. The style of drawing is clear, and the detailed drafting of the coast line and drainage surpasses in accuracy any of the previously published maps. The manuscript copy was made on the scale of 5 miles to an inch, and the published base is reduced to 8 miles to an inch. That a few errors crept in and were overlooked is perhaps to be expected, considering the time allowed for its preparation. The most noticeable of these oversights is that relating to the boundary between Somerset and Worcester counties. The map seems to indicate that the boundary is along the Pocomoke to Parkers Bridge instead of along Dividing creek. This error arose from the use of Martenet's map of the state, where parts of several of the county boundaries are omitted.

The geology of the state is more fully represented than in any previously published map. Thirty-two colors and patterns are used to indicate the different formations. The small index map shows that the Coastal Plain is based on Darton, the Piedmont Plateau on Williams, the Blue Ridge on Keith, and the country west of the Hagerstown Valley on Geiger, Tyson and White.

The first division of the work follows closely the lines given by Darton in some of his smaller maps, and indicates considerable familiarity with all of the Western Shore and the northern portion of the Eastern Shore. South of Queen Anne's there is no attempt to separate the Miocene, Pliocene and Pleistocene deposits. While considerably generalized from the known thickness and position of the formations at scattered localities, the mapping shows a greater degree of detailed accuracy than any of the earlier maps. Criticisms made on some of the more specialized maps apply to the present one though in less degree (see p. 471).

The greatest advance is in the mapping of the Piedmont Plateau, where Williams gives general expression to conclusions based on several years' work. Many of the lines were derived originally from Tyson and subsequently corrected by Williams. The area about Baltimore is mapped after detailed observations, while that along the northern part of Cecil, Harford, Baltimore and Carroll counties is based upon a few hurried reconnoissance trips taken by Williams

or his students at widely separated intervals. The boundaries laid down on this map have been checked in almost all instances, showing that the author had a clear appreciation of the general distribution of the different rocks. The details are necessarily wanting in accuracy where the lines laid down are derived from hurried preliminary surveys. Among the changes which have been adopted since the publication of this map are those based on Keith's detailed work along the boundary between the gneisses and phyllites in Montgomery, Howard, Frederick and Carroll counties. These indicate that the arbitrary boundary given by Williams is not a simple line, but, instead, is a highly complex one representing an intricate interfolding of the two formations. The map also shows the omission of many small bodies of altered andesite (Catoctin schist), diabase and serpentine, which have been located by Keith, Mathews and others who have worked in the area.

That portion of the map credited to Keith, including the Blue Ridge and the Catoctin Mountain, represents at the same time one of the most complex and most carefully studied portions of the state. The lines delineating the various formations are based almost entirely on his work, while the interpretation of the original characters af the quartz porphyry and diabase as rhyolite and basalt are based on the detailed petrographical work of Williams and Miss Bascom. The areal distribution indicated by Keith has been followed in the maps published by the present State Geological Survey.

West of Hagerstown the mapping, with the exception of that in the coal regions, is based almost entirely on Tyson and the reconnoissance work of Geiger along the Potomac (1885-'88). This is the most generalized part of the map, but accords in a considerable degree with the present knowledge of the area which has been greatly increased in Garrett and Allegany counties. The failure, however, to recognize a transverse fold in Garrett county renders the northwestern corner of that county of little value.

The economic value of this map is greatly increased by a correlation of the soils with the underlying formations, thereby rendering the geological boundaries serviceable as an agricultural map.

Maryland Geological Survey Map, 1897.

The latest and most authentic geological map of the state appeared as plate xiii of the first volume of the present series of reports. This map, prepared by the Maryland Geological Survey, is a compilation of all the reliable information available checked by a preliminary survey of the entire state and represents a summary of existing knowledge at the time of its publication.

The base upon which it is drawn is printed from two newly engraved copper-plates of exceptional geographic fidelity and execution. Since the map of 1893 was used as the general authority, the present map follows it in the erroneous representation of the boundary between Somerset and Worcester counties and the heads of the Gunpowder and Deer creek. Each of these streams rise outside of Maryland. There is also a slight error in the drawing of the curved boundary about New Castle, Delaware, since the tangent point is just south of the Baltimore and Ohio Railroad instead of some miles north of it. The direction of the eastern boundary of the state north of this intersection is also incorrect, since it is a meridian line and not a continuation of the northerly line from the middle of the peninsula.

Like the base upon which they are laid, the geological formations are represented with the highest skill in execution attainable, with the result that there is no harshness in general effect, although thirty-four different divisions are clearly distinguished from each other. The colors are also so arranged that they bring out the three major divisions of the state—the Coastal Plain, the Piedmont Plateau, and the Appalachians—without destroying the unity of the sheet.[1]

Drawn on the small scale of 16 miles to an inch, or 1:1000000 of nature, it is impossible to incorporate all of the detailed information acquired by a complete reconnoissance of the entire state which was accomplished prior to the appearance of the map. There is, nevertheless, more detail on this small-sized sheet than has been published in any other geological map of the entire area. Certain of the additional features are worthy of more extended notice.

Within the area of the Coastal Plain the mapping of the forma-

[1] The map was lithographed by A. Hoen & Co., under the personal supervision of Mr. A. B. Hoen.

tions by the distribution of their colors brings out the eastward transgression of the later over the Cretaceous. The lines between these formations were given in some detail by Darton on the Williams map just described, but the broad geographic relations existing between the divisions of the Tertiary formations were not expressed cartographically before the publication of this map. The subdivision of the Cretaceous is likewise more fully given than on any previous map of similar scale as the result of recent work by Professor Clark.

In the area of the Piedmont Plateau the additional information of the writer in Cecil, Harford and Baltimore counties, and the detailed work of Keith in the western portion of the district, are represented by many improvements in the delineation of the formations. Changes are especially noticeable in the territory studied by Keith. The large belt of granite extending from Selbysport to Great Falls, and the numerous small bands of diorite within the same area, are improvements in the interpretation and determination of the rocks exposed. The various narrow strips of serpentine and phyllite show a sharper separation of these rocks from the enclosing "country" gneiss. The colors of the map make the limits of the different rocks appear much sharper, however, than they are in nature, where it is sometimes quite difficult to determine the exact point of passage from one formation to the other. This is particularly true in the location of the general line between the gneisses and phyllites. Compared with the generalized line laid down by Williams, the present boundary has been moved several miles farther west at its southern end, and the whole manner of representing the contact has been changed as a result of the detailed work along the entire boundary. In a similar manner, the belt of phyllites has been separated into two broad bands by zones of infolded lenses of limestone and Catoctin schist which follow the general trend of the formation. West of the Blue Ridge the changes introduced in the survey map are based upon the reconnoissance by members of the state organization. Few prominent changes have been introduced in the map, but in almost all portions of the region the folds have been sharpened and modified in their extent to conform to the more recently acquired information. Certain of

the beds, like the Hampshire east of Town creek, are stopped before reaching the Mason and Dixon line in order that the map may harmonize with the work of the Second Pennsylvania Survey. The greatest change is in the representation of the Lower and Upper Coal Measures on the east side of Savage Mountain, although considerable differences are noticeable in the mapping of the northwestern portion of Garrett county. In the former instance, many outliers of the Fairfax formation are indicated between the different streams flowing from Mount Savage into the Potomac between Bayard and Piedmont, West Virginia. These are entirely lacking in the earlier map by Williams, and their location is determined in great measure from the mapping of the Piedmont sheet by Darton and Taff. A still more important difference in mapping lies in the representation of the so-called "Frostburg" formation, which is regarded as probably of Permian age. Many other features of minor importance indicate additions to the cartographic representation of the state.

While there has been a marked increase in the accuracy of detail, as well as in the execution in these maps by the present survey, there are, unfortunately, one or two errors which escaped notice during the proof-reading of the sheet. For example, in Cecil county, the eastward trending tongue of gabbro is represented as extending too far. Again, in the Blue Ridge, by an interchange in the legend, the rhyolitic or acid rocks are described as basic volcanics, while the basalts or Catoctin schists are described as acid volcanics. The limits and delineations of the two formations are accurate with this interchange in legend. That portion of Garrett county north of 39° 30′ represents the knowledge of the territory as understood at the time the map was published. Later work in the preparation of the county reports has shown that the view there expressed is unwarranted, and that the distribution of the various formations is much more complicated than there represented because of the presence of a transverse fold whose axis is some ten miles north of Deer Park.

Although the general appearance of this geological map indicates that the work in the region has been successfully accomplished, it really represents no more than the best founded generalizations regard-

ing a large portion of the territory of the state. Up to the time of the organization of the present survey no accurate maps were available upon which to lay down the geological characteristics of all of the territory north of the latitude 39° 30′. The same is true of the greater portion of the Eastern Shore. Without the aid of such maps, it has been inexpedient to make detailed studies in these territories, and only after the preparation of adequate maps, now undertaken, will it be possible to present in cartographic form any detailed results of studies in the region.

GEOLOGICAL MAPS OF THE COASTAL PLAIN.

Enough has been given already in the preceding discussion of the geological maps embracing Maryland to show that from them much may be gained regarding the personal interpretation of the phenomenon studied by various investigators. This feature, however, is even more evident when the larger scaled individual maps of restricted areas are considered, for from them one is able to derive information regarding an author's interpretation, not only of the broader problems involved, but also of special deposits in different portions of the regions studied. In the study of the Coastal Plain there are a few men particularly prominent who have expressed their conceptions in text and maps.

Chester, 1884. Considering the cartographic work of these students in something of a chronologic order, the first map devoted to the problems of the Coastal Plain is found to be by F. D. Chester and entitled "Maps showing Distribution of Delaware Gravels—Northern Area." This little map, comprising the greater portion of New Castle county, Delaware, and all of Cecil county, Maryland, was drawn to illustrate a paper in the American Journal of Science.[1] The chief value lies in the fact that it shows the boundary between the crystalline rocks and the overlying Potomac or Delaware gravels, and that these gravels extend as far south as the Sassafras. The map is somewhat crudely drawn in a single pattern, and no attempt is made to indicate such outliers of the older rocks as the gabbro and serpen-

[1] Amer. Jour. Sci., 3rd ser., vol. xxvii, 1884, p. 192.

tine masses between Elkton and Iron Hill Station on the Pennsylvania Railroad.

Heilprin, 1884. During the same year, as an illustration for his paper on the "Tertiary Geology and Paleontology of the United States," Heilprin[1] gives a map entitled "The Tertiary Geology of Eastern and Southern United States," which is composed in reality of two parts. On the general map no Eocene is represented on the eastern peninsula between Annapolis and New Jersey, while on the larger scale map of this same region are shown two indefinitely bounded areas of Eocene in Kent county. The representations are without boundaries, and there is no indication of the gradual transgression of the Miocene eastward. Although six colors, or symbols, are used to indicate the subdivisions of the Miocene, Oligocene, and Eocene, that portion of the map representing Maryland is covered only by the Miocene and Eocene pattern, as the Oligocene is not recognized in the state. The base on which the map is drawn is rather poor and somewhat indefinite, so that exact correlation of the lines indicating boundaries between the different formations is impossible.

McGee, 1888. Subsequent to the formation of the Potomac Division of Geology in July, 1883, W J McGee spent considerable time in studying the Coastal Plain region adjacent to the Potomac river in the District of Columbia, Maryland, and Virginia and also in an investigation of the same formations along the greater portion of the Middle Atlantic Slope. During his studies in 1886, Mr. McGee made several visits to the region about the head of the Chesapeake Bay, which resulted in a paper on "The Geology of the Head of Chesapeake Bay."[2] This paper was illustrated by maps and stereograms. The former, entitled a "Map of the Head of Chesapeake Bay, Showing the Distribution of the Columbia Formation," is drawn on a clearly outlined base on the scale of about 5 miles to an inch. The geological features are indicated by a new style of cartographic representation, by which not only distribution, but also the coarseness and the thickness of the gravels are represented by the frequency and the diameter of the colored circles. This map is scarcely more than its

[1] Jour. Acad. Nat. Sci., Phila., 2nd ser., vol. ix, 1884.
[2] Seventh Ann. Rept. U. S. Geol. Surv., 1888, pp. 537-646, plates 56-71.

title implies, and is accompanied by a stereogram of the Middle Atlantic Slope, which illustrates clearly the author's conception of the relation between the Coastal deposits and the underlying rocks. This is drawn on a horizontal scale of 35 miles to an inch, and a vertical scale of 35,000 feet to an inch.

Uhler, 1888. During the same year an untitled map was published by Professor P. R. Uhler to illustrate his paper on the distribution of the Albirupean formation in Maryland. This is a small sketch 4 by 3.6 inches in size, drawn in black and white, on the scale of about 20 miles to an inch. It represents the drainage, and uses 3 patterns to indicate the geological formations distinguished. Northwest of the Upper Cretaceous formations are shown the Albirupean and Baltimorean (Potomac) formations. The boundaries between these different deposits differ somewhat from those adopted by the present State Geological Survey, but have been accepted by certain members of the U. S. Geological Survey and represent clearly the interpretation of this very complex problem as given by Professor Uhler.[1]

Darton, 1889. In 1889 N. H. Darton was assigned to work in the Coastal Plain region of Maryland and adjoining states, and spent the next five years in almost continuous field work in the area making preliminary reconnoissances along the shores of the Maryland rivers. Detailed mapping over much of the territory was also carried on for the folios of the geologic atlases of the United States. This work resulted in a number of papers which have been illustrated by small maps and in several folios including Maryland territory. The first of these minor maps appeared accompanying a paper on the "Mesozoic and Cenozoic Formations of Eastern Virginia and Maryland."[2] It is 4.75 by 7.50 inches in size and is drawn in 7 patterns in black and white, on the scale of 25 miles to an inch. The base used is fairly good but just enough indefinite to make the detailed interpretation of the mapping unsatisfactory. Compared with the present views held

[1] The statement given in vol. i, p. 302, as a summary of the paper which this map accompanies suggested an apparent disparagement of Professor Uhler's conclusions. Such was not the intention and the writer apologizes for his unfortunate phraseology.

[2] Bull. Geol. Soc. Amer., vol. ii, 1891, p. 431.

regarding the distribution of the various formations represented, there are variations in the delineation of the Potomac north of the Pennsylvania Railroad, between Elkton and the state line, since there is no indication of the presence of the gabbros and serpentines platted by Chester on his map of the Delaware gravels.[1] The Potomac seen at the base of the cliffs just south of the mouth of the Sassafras river has also led to the representation of too large a band of this formation, since it is represented as extending some distance inland from the shore of the bay. On the whole, however, the map is very good, for its scale and most of the errors in the few spots indicated on the Eastern Shore are recognized by the author to be only approximate representations. This is especially true in the mapping of the region along the Chesapeake and Delaware canal, where the Cretaceous (Monmouth and Rancocas) is erroneously represented as Eocene (Pamunkey).

Another small map published by Darton in 1893 to illustrate his paper on the "Magothy formation of Northeastern Maryland," gives a small sketch drawn on the scale of 10 miles to an inch in 5 patterns. In this map the representation of the Eocene (Pamunkey) is at the other extreme from that of Heilprin, for it is made to extend from near Swan Point to beyond the Sassafras river as a single broad band. Just north of the latter point it is suddenly limited across its strike. Compared with the earlier map, it is noticed that the sketching is more detailed and that certain of the lines of the western shore, notably about the Magothy river, are very different from those of the earlier map. There is, however, an advance in clearness and neatness over preceding sketches by this author, and a sharp contrast with a map published a little later in the Journal of Geology to illustrate the author's conception of the Pleistocene submergence. This latter map is apparently drawn somewhat carelessly on an inaccurate base. The scale is about 50 miles to an inch. A second small map in the article in the Journal of Geology above-mentioned is on the small scale of 50 miles to an inch, but is better drawn and shows Darton's conception of the deformation of the Tertiary peneplain expressed in 100-foot contours. The map also represents the extent of the Lafay-

[1] Bull. U. S. Geol. Surv. No. 59, p. 7.

ette and the post-Columbia ocean. Although the sketching brings out the geological features distinctly, the general effect is harsh and there is little or no attempt at detailed accuracy.

Clark, 1896. Accompanying a paper on the "Eocene Deposits of the Middle Atlantic Slope in Delaware, Maryland and Virginia,"[1] by Wm. B. Clark, is a small page map showing the distribution of the Eocene strata. The scale of the map is small and does not permit of accurate delineation of the formation represented with the pattern used. The lines laid down as the limits of the formation differ somewhat from those given in the succeeding map. Here the Eocene is represented as extending in a broad band across the Eastern Shore from the Sassafras to the southern bank of the Chester. This indicates a much greater northward extension of the Eocene than is now accepted. The same general criticism may be made of the mapping of the Western Shore, although the lines are so generalized that this difference from the later maps is not so noticeable. This sheet represents the sum of knowledge regarding the Eocene existing at the time of its publication.

Clark, 1897. In a general paper by Wm. B. Clark[2] on the "Upper Cretaceous Formations of New Jersey, Delaware and Maryland," are maps and half-tones illustrating the text. Among the maps is one "showing the distribution of the Upper Cretaceous Formations in Maryland and Delaware." On a sheet, 8 by 10 inches in size, is included the territory between the Potomac and the Delaware. The three divisions of the Upper Cretaceous are indicated by three body colors.

The lines laid down between the different subdivisions are almost the same as those given in the smaller-scaled map by the Maryland Geological Survey, already described. The details are more evident because the scale of the map has been increased to 8 miles to an inch. Two features of the areal distribution are especially brought out. These are the large areas of Cretaceous on the Eastern Shore with simple, almost straight, boundaries; and the narrow intricately outlined areas of the Western Shore. The narrowing of the formations brings out the Eocene with its increasing transgression westward.

[1] Bull. 121 U. S. Geol. Surv., 1896.
[2] Bull. Geol. Soc. Amer., vol. viii, 1896, p. 328.

GEOLOGICAL MAPS OF THE PIEDMONT PLATEAU.

Almost all of the maps representing the geological features of this portion of Maryland are the result of work carried on under the United States Geological Survey by the late Professor Williams and his students or members of the permanent staff of the Federal organization. Considering the various maps in chronological sequence, it is possible to gain some conception of the progress made in the knowledge and interpretation of the entire region during the years succeeding 1886.

Williams, 1886. The first detailed work, subsequent to that of Tyson conducted before the war, was commenced about the city of Baltimore and resulted in the publication of a Bulletin of the United States Geological Survey[1] on the gabbros of Baltimore and vicinity, by George H. Williams. This work is illustrated by a "Geological Map of the Baltimore Gabbro-Area," which is drawn on the Johns Hopkins University excursion map as a base. Five colors are used to indicate the limits of the different rocks considered, and a difference is made between the observed exposures and the inferred extent of the formations. The territory embraced in the geological portion of the map extends from Lake Roland to Ellicott City. Although most of the observations appear to have been made along the highways and railroads, the map gives a large amount of detailed information concerning the formations discussed, and this map has served as the basis in the delineation of the Baltimore gabbro area in all subsequent maps published by the Johns Hopkins University and the U. S. Geological Survey.

Chester, 1890. As a result of the work by Williams and in continuation of the investigations carried on by him, F. D. Chester published a second bulletin[2] on the gabbro area of Delaware, which is also illustrated by a "Map of Gabbro-Area in Delaware." This map is drawn on a scale of approximately three miles to an inch and is almost entirely devoted to Delaware territory. There is, however, a somewhat roughly-drawn extension of the gabbro area on the western side of the Delaware boundary. The limits laid down are only ap-

[1] Bull. U. S. Geol. Surv. No. 28, 1886. [2] Bull. U. S. Geol. Surv. No. 59, 1890.

proximate, and no attempt has been made to distinguish the mass of serpentine cut by the railroad west of Iron Hill Station.

Keith, 1891. Illustrating the paper by Geiger and Keith on "The Structure of the Blue Ridge near Harper's Ferry"[1] is a small plate drawn by the junior author, Arthur Keith, on a scale of 6 miles to an inch. On this sketch, in six black and white patterns, is laid down the areal distribution of the various formations occurring between Harper's Ferry and Point of Rocks. The amount of detail expressed is necessarily somewhat limited by the scale of the map, but is far greater than had been published prior to its appearance. Accompanying the plate are a series of sections representing the structural interpretation.

Williams, 1891. In the same volume[2] is the first expression by Williams of his interpretation of the general structure of the Maryland portion of the Piedmont Plateau. The mapping, which is on the scale of about 14 miles to an inch, indicates little of the distribution of the formations of the Piedmont Plateau, which is bordered by patterns indicating the limits of the Coastal Plain deposits, the limestones of the Frederick Valley, and the Triassic sandstones. For the first time the Triassic dike is mapped in its entirety. No indication is given, however, of the subordinate dikes adjacent to it on the east. Across the otherwise unpatterned Piedmont Plateau are lines indicating the boundary of the semi-crystalline against the crystalline rocks and the supposed axis of the deformation of the Piedmont region. The expression of the boundary between the crystalline and semi-crystallines of Montgomery and Carroll counties is given here for the first time on any map.

Williams, 1892. In order to illustrate more fully the geological and topographic features of Baltimore and vicinity to the visiting mining engineers in 1892, several maps were published under the editorship of George H. Williams. The geological maps of this series are based upon the work of members of the U. S. Geological Survey, especially N. H Darton, on the sedimentary formations, and the editor on the crystalline rocks. The base on which their results are laid down is the ordinary topographic base of the U. S. Geological

[1] Bull. Geol. Soc. Amer., vol. ii, 1891, pl. 4, p. 158. [2] Ibid, pl. 12, p. 301.

Survey, drawn on the scale of approximately one mile to an inch, or 1:62500 of nature. The surface of the territory is represented in 20-foot contours. The first issue of this work included only the territory of the Baltimore quadrangle, and was printed in part to test the color scheme recently adopted by the Federal bureau. This edition appeared in two forms. There was one complete map showing all of the different formations of the Piedmont Plateau and Coastal Plain included within the map, and a second giving the territory of the Piedmont Plateau in a pale tint with the features of the Coastal Plain brought out in their full detail. The colors adopted in the more complete map were unsatisfactory, as the appearance of the sheet is not pleasing or harmonious in its color tones. These two forms of printing the Baltimore sheet were only preliminary and have never been put forward in final form by the U. S. Geological Survey. In coöperation, however, with this organization, the Johns Hopkins University brought out a larger map including the same territory and portions of contiguous quadrangles. This sheet is approximately 24 inches square, and embraces all of the country from Guilford and Stoney Point on the south to Worthington's Valley on the north, and from Marriottsville on the west to Back river on the east. The base upon which the geological formations are laid down is the same as in the preceding prints, but the colors employed in the representation of the various formations are different and do not wholly conform to the color scheme adopted by the U. S. Geological Survey. Twenty colors are used in representing the various formations, and the detail of the map is greater than in any previously prepared in the state. The work remains to the present as authoritative, and indicates the fidelity with which the details of these intricate portions of the territory were worked out. An especially interesting feature of the mapping lies in the representation of the schistosity in the gneisses of the region by the direction of the hachure overprint, in which the individual hachures follow the strike of the local schistosity. By this contrivance it was possible to represent the extremely distorted and complex character of the gneissic formation which otherwise might have appeared as exceedingly simple.

Russell, 1892. Among the maps illustrating I. C. Russell's essay on the Newark [1] is one representing the distribution of this formation between New York and Virginia. It is a small map 8 by 10 inches in size, upon which are represented in four colors the post-Newark, Newark sediments, Newark trap, and pre-Newark formations. The mapping of the boundary between these various deposits is in considerable detail and indicates the general relations between them. In the outline of the Newark deposits of Maryland there are some differences noticed between the delineation on this map and that based on the latest field observations. This is particularly true just east of the Potomac river, where the sediments have been narrowed considerably until their limits are west of the trap dike instead of extending for some distance on the eastern side, as mapped at present. The distribution of the igneous masses near the northern boundary of the state is also different. The main mass or sheet, extends south of the Mason and Dixon line in later representations instead of terminating north of that line as on the Russell map. Some of the smaller dikes across the state are also omitted, for example, east of Emmitsburg, near Westminster, and in Cecil county. It is not strange that such omissions are evident upon this sheet, which is based upon the best information at hand when the map was published. The omissions noted have become evident through subsequent field investigation.

Keith, 1894. Continuing the work outlined in the paper of 1891, Arthur Keith published in 1894 [2] a general paper on "The Geology of the Catoctin Belt," which is profusely illustrated with photographs, maps and sections. Of these, the most valuable addition is in the geologic map of the Catoctin belt, which is drawn on the scale of 1:375000 of nature, with contour intervals of 200 feet. The sheet, which is 10 by 13 inches in size, embraces the territory between Monterey, Pennsylvania, and the Rappahannock river. It thus includes a zone across the state extending from North mountain to Frederick. This sheet is the first adequate cartographic delineation of the complex region of the Blue Ridge. On it, for the first time, are outlined the various areas of Catoctin schist, granite, sedimentary

[1] Bull. U. S. Geol. Surv. No. 85, 1892.
[2] 14th Ann. Rept. U. S. Geol. Surv., Washington, 1894, part ii.

and volcanic rocks present in the area. The interpretation given in the earlier map by Geiger and Keith is not followed, since the complexity of the region is now known to be the result of faults rather than of simple folds. This map represents the most detailed and perfect delineation of the territory yet published.

Accompanying this general geological map is another on a similar base representing the form of the Tertiary base-level with 100-foot contours. Along with these maps are several plates and diagrams indicating cartographically the variations in the character of the granite, the thickness and character of the Loudoun formation, and the Weverton sandstone.

Other maps, such as those accompanying Keyes' paper on "The Central Maryland Granites" [1] and Grimsley's thesis on "The Granites of Port Deposit," [2] represent detailed mapping in the field, but most of the information therein contained is incorporated in the general map of the state by Williams, under whose direction the field work was conducted. The sketch by Grimsley, which is somewhat crudely drawn, represents the general distribution of the various formations by six patterns in black and white. The territory included is along the east bank of the Susquehanna river from Perryville to the Pennsylvania line, and the location of the boundaries is the joint work of Grimsley and A. G. Leonard. Keyes' paper has a map showing the distribution of the granitic masses described in the text, the granite areas being colored upon a black and white background representing the culture and drainage of the territory between the Susquehanna and the Potomac. The individual areas are represented in some detail, but they conform in their interpretation to the earlier view as held by Williams, rather than to the views expressed in later maps. This is especially evident in the masses between Sykesville and Washington, which are now united to form a single area following Keith. The lines of demarkation between the granites, the granite gneisses, and the gneisses are not particularly sharp in nature, thereby permitting some latitude in interpretation.

[1] 15th Ann. Rept. U. S. Geol. Surv., 1895.
[2] Jour. Cincin. Soc. Nat Hist., 1894.

GEOLOGICAL MAPS OF WESTERN MARYLAND.

The western portion of Maryland, unlike those parts already discussed, has had little detailed work upon it resulting in local geological maps of the region. While Lyell, Hall, Silliman and others have studied in the area, few have presented other than the most generalized results relating to the local geology. As early as the second half of the seventeenth century the maps show that the presence of coal had been recognized in the George's creek basin, for we find on the Fry and Jefferson map of 1755 a coal mine located on the North Branch of the Potomac river not far from the mouth of Savage river. There are also occasional notes regarding the resources of the region in such maps as that of Griffith in 1794.

Alexander, 1837. The first map with any detailed information regarding the territory, however, was that published by J. H. Alexander in the Report of the State Geologist for 1837. This sheet, which is drawn on the scale of 1.25 miles to an inch, gives the location of the coal veins and the opening of the mines then in operation. The accuracy of the base upon which these lines are drawn has already been discussed in the preceding pages. This work of Alexander has remained as the basis for commercial maps of the territory, although many modifications and changes have been introduced to keep the map in harmony with the present workings of the region. One of the latest of the commercial maps of the George's creek region was published in a souvenir volume commemorating the visit of Sir Archibald Geikie to the mines in the spring of 1897.

Hall, 1874. In 1874 James Hall prepared[1] a map illustrating his paper on the relations of the Niagara and Lower Helderberg Formations. This sheet, on the scale of approximately 55 miles to an inch, gives the supposed location of these two formations between North Mountain and the western boundary of the state. The interpretations of the formations as given on this map differ widely from those accepted at the present day, since at least four bands of Helderberg are represented as crossing the state west of Cumberland. Now a single line of exposures is indicated on the map.

[1] 28th Ann. Rept. N. Y. State Museum, Albany, 1877.

White, 1891. In his map of the Upper and Middle Carboniferous formations, I. C. White[1] gives the first geological map of these formations subsequent to that published by Tyson in 1859. The Lower Carboniferous and the Upper Coal Measures with intervening members of the series are mapped very much in the same way as on the Williams map of 1893, which credits White with the western portion of the sheet. The difference between the lines there laid down and those accepted at the present time are shown by a comparison of the geological map published in the first volume of these reports and Plate XXX of the present volume representing the distribution of the sandstones and conglomerates of the state.

Weeks, 1894. Somewhat later J. D. Weeks published a black and white sketch of the upper Potomac and Elkgarden coal basins to illustrate a paper[2] on the area. This sheet, which forms a two-page plate on the scale of 3¾ miles to an inch, represents the physiography of the region and the limits of the coal formation. The only portion of Maryland represented is that between the North Branch of the Potomac and Great Backbone Mountain.

Special Topical Maps.

Besides the great number of geological maps which have been made representing the geology in various portions of the state, there have been published from time to time other topical maps dealing with various subjects, such as the distribution of the soils, the climatic, magnetic or medical conditions of the state. Perhaps the most interesting of these various maps which have been published are those indicating the character of the soils overlying the different geological formations.

AGRICULTURAL SOIL MAPS.

Philip Tyson was the first to emphasize the relations existing between the soils and the underlying rocks in his report as agricultural chemist in 1860. A careful study of the text of this report in conjunction with the geological map allows one to gain a general view

[1] Bull. 65, U. S. Geol. Survey, 1891.
[2] 14th Ann. Rept. U. S. Geol. Surv., part ii, 1894.

of the character of the soils in the different portions of the state. Later, after extended studies on the characteristic soils, especially in the eastern part of Maryland, Milton Whitney made a similar correlation of the soils and geological formations which appears on the geological map edited by Williams in 1893. About the same time a small map was published by the same author in Bulletin 21 of the Maryland Agricultural Experiment Station "showing the area and distribution of the principal soil formations in Maryland." Upon this little map, which is drawn on the scale of about 25 miles to an inch, are represented twelve different soils, distinguished in many cases by the percentage of clay found in each. The soils of the Eastern Shore are not classified because the region had not then been studied.

CLIMATOLOGICAL MAPS.

Climatological maps relating to Maryland first appeared in a Martenet atlas of the state published in 1873. The sheet was prepared by L. Blodgett on the scale of ten miles to an inch, and was accompanied by a short sketch describing the climatic conditions of the region.

With the organization of the Maryland State Weather Service in 1891, under the direction of Professor Clark, the interest in meteorological and climatological subjects increased, and in the first number of the second volume of the monthly reports of this service appeared the first of a series of maps showing the precipitation and the lines of mean temperature for each succeeding month. Since the summer of 1896, when the monthly reports of the State Weather Service were merged into the Crop Bulletin of the U. S. Weather Bureau, the latter organization has continued to publish monthly maps representing the rainfall and the temperature. With this change a new base was introduced, slightly different in size and character, and the overprint was changed from red to blue.

The Maryland State Weather Service, from the data acquired during its work, has also published in each of its biennial reports five maps representing the average temperature and precipitation for each of the seasons as well as for the entire year. These maps are drawn

on a scale of about 15 miles to an inch, and represent the precipitation in blue, the temperature in red. Still more elaborate and valuable maps were published by this same organization in 1893 in the form of a series of "Climatic Charts of Maryland including Delaware and the District of Columbia." This series embraces five maps in blue showing the average precipitation for the year and for each of the four seasons. The precipitation is represented in five shades, to indicate the difference in rainfall for the various portions of the state. There are likewise five charts showing the average temperature for each of the seasons and for the year drawn in red with an overprinting of the isothermal lines in deeper red. All of these charts are drawn on the base previously described on page 463. It is on the scale of 8 miles to an inch or 1:500000. These charts represent the most detailed cartographic delineations of the territory yet published.

MAGNETIC MAPS.

Magnetic maps showing the distribution of the lines of magnetic force, or the values of the horizontal declination of the needle at different periods, have been published at various times during the last century. The earliest map of this nature giving any considerable information regarding Maryland territory was published by Churchman before the close of the last century. Similar maps have likewise been employed to illustrate the various papers on terrestrial magnetism published in the reports of the Superintendent of the U. S. Coast and Geodetic Survey.[1]

The latest magnetic map of the state, based upon nearly twice as many observations as previously recorded in any paper, appeared in the first report of the present series. It is entitled "A preliminary Isogonic map of Maryland, including Delaware and the District of Columbia, for January 1, 1900, by L. A. Bauer." The isogonic lines, or lines of equal magnetic declination, are drawn for every half degree, and show that the constant variation is about 2° greater in the eastern portion of the state than in the western portion. A comparison of this map with the geological map of the same territory shows

[1] See Schott, C. A., Md. Geol. Surv, Rept., vol. i, p. 330.

an interesting relationship between the isogonic lines and the underlying formations.

A small map showing lines of equal magnetic inclination and equal horizontal force is also given.

MISCELLANEOUS MAPS.

Various maps have been published from time to time illustrating the character and source of the water supply in various parts of the state. Among the earliest of these water maps is one by Dr. Toner, published in the Transactions of the Medical and Chirurgical Faculty of Maryland. This is really little more than a sketch-map showing the distribution of the different formations of the Coastal Plain which are represented as differing in the character of the waters which they bear. The most exhaustive work on the waters of the state is by N. H. Darton of the U. S. Geological Survey.[1] Illustrating that portion of the paper dealing with Maryland are three maps and several sections. The maps are entitled respectively:

Map of Baltimore Region illustrating features of underground waters.

Map of a portion of District of Columbia illustrating features of underground waters.

Map of Eastern Virginia showing distribution of underground waters.

The first two maps use as a base the topographic sheets of the Survey on the scale of 1:62500. They show the contours, culture and drainage of these maps and represent the exposure and approximate catchment area of the Potomac waters, the area of the crystalline rocks, and the territory underlain by the Potomac at a depth greater than fifty feet. Heavy blue lines across the sheet indicate the depth below sea level of the contact between the gravels and the underlying crystalline rocks, while dotted over the sheets are symbols indicating the location of successful and unsuccessful wells. The third sheet is on a much smaller scale, and represents the regions respectively underlain by the Chesapeake, Pamunkey, and Potomac waters, together

[1] Artesian Well Prospects in the Atlantic Coastal Plain Region. Bull. 138 U. S. Geol. Surv., pp. 124-161.

with the limits of the crystalline rocks. The portion of Maryland embraced in this map consists of the Western Shore south of Washington and the Eastern Shore along the edge of the bay. These maps represent at a glance the depth at which water-bearing zones may be expected in the different portions of the Coastal Plain.

Somewhat related to the preceding maps are several prepared under the direction of W J McGee,[1] representing the supposed condition of the territory of the Coastal Plain during several of the later geological periods. These are all drawn on a uniform base on the scale of 1:5000000. The physiography of the continental platform is represented with 100-foot contours on the land and with 100-fathom contours in the submarine portion. The running water is in blue and still water is in pale green. On this base McGee represents the general distribution of the Lafayette and Columbia formations, the physiography of the territory in Lafayette time, in post-Lafayette and pre-Columbia time, and the submergence in the Columbia time. The means employed in this representation are shiftings of the running and still water over-prints of supposed aërial and submarine contours, and contours representing the supposed deformation of the country at the different periods. While on too small a scale to represent in detail the oscillations which have taken place in any individual locality in Maryland, these maps are of great value in giving at a glance the latest conceptions of the broad continental changes which have taken place over the entire eastern portion of the Middle Atlantic slope. The constant presence of the physiography of the land as it exists today facilitates a comparison which brings out the changes that have taken place and greatly increases the value of these maps.

Summary.

A summary of the many details given in preceding pages may be expressed by the tracing of the growth in knowledge regarding the natural features of the state, in the summary of maps available for reference in illustration of the different historical periods, or in the enumeration of the best maps available at the present day for the different portions of the state.

[1] 12th Ann. Report U. S. Geol. Surv., vol. i, Washington, 1891.

DEVELOPMENT OF KNOWLEDGE.

The early cartographic representation of the territory of Maryland is devoted almost exclusively to the delineation of the shores and lands bordering on the Chesapeake and the Potomac. No attempt was made during the first century subsequent to the settlement of the English in Jamestown to depict with any degree of accuracy the character of the interior portions of the country. In fact, they were not known except along one or two of the larger waterways. The growth of knowledge regarding the land adjoining the bay was made for the most part at a few periods. Smith, in his memorable voyage of discovery up to the mouth of the Susquehanna gained more information regarding the character of Chesapeake Bay than did any of his successors. His knowledge was accurate and detailed regarding those portions of the land which he visited, but was naturally inaccurate in many of the intervening portions portrayed in his map. The features of particular value in the Smith map are the shores of Somerset, Dorchester, and Cecil counties, and the coast-line between the Patapsco and Point Lookout. The mapping of the Potomac is based on a fairly careful reconnoissance, but the accuracy of the work is not as great as in the portions of the map just enumerated.

The Lord Baltimore and Alsop maps show some slight advance in knowledge, especially along the Eastern Shore and the Potomac, but no marked step forward was taken prior to the careful work of Augustine Herman between 1660 and 1670. The Herman map for the first time presents an accurate delineation of the intricate shore-line between Cambridge and Chestertown. No earlier map in any wise equals it in the abundance of local names or in the faithfulness with which the sinuosities of the shore-line are portrayed.

From the time of Herman until the later portion of the eighteenth century little improvement was made in the representation of the Chesapeake. The charts of Anthony Smith, published in various editions from 1776 to 1800, are on a much larger scale than had been attempted in any previous map, and show a great increase in the cultural details represented. The map is full of symbols, representing with considerable faithfulness the various structures along the water-

front. About the same time there appeared the first of the accurate maps representing the region about Havre de Grace at the head of the Chesapeake Bay.

It was not until the second quarter of the eighteenth century that any knowledge was acquired regarding the regions of the Appalachians west of the Blue Ridge and the valley of the Shenandoah; even then this information was limited almost exclusively to the valley of the Potomac. Scarcely anything was known of the mountainous country lying at any distance from the North Branch or the South Branch of the Potomac. The map drawn by Fry and Jefferson in 1751 gives some information, but it was not until Griffith's map of 1794 was published that the slowly acquired knowledge of the western portion of the state was rendered available. Even this map, which stands far superior to the majority of the cartographic works published in America just subsequent to the Revolutionary war, is far from full in the details which it depicts. The extended and well authenticated topographic information of the surveys which progressed during the era of internal improvement was necessary before many of the gaps in the contemporary knowledge could be filled up.

No attempt was made to delineate the inequalities of the surface until the inauguration of the work by Alexander and Ducatel, while little was attempted in the way of road traversing prior to the extensive surveys by Martenet. Earlier maps show many roads and hachured hills, but the representations are in almost all instances sketched and not the result of carefully prosecuted surveys.

STATE OF CARTOGRAPHIC INFORMATION.

Reviewing all of the maps which have been published from original material, one may enumerate the following maps which represent the most accurate cartographic information available for use at the present time. All of the territory west of Hancock and south of Washington has been surveyed by the topographic corps of the United States Geological Survey. Their work has likewise extended to the territory between Baltimore and Washington south of 39° 30′, with some work along the western portion of the Eastern Shore. Much of the material which has been gathered together by this bureau has been

published, and there will soon be available, besides the sheets enumerated in the first volume of the present series of reports, several others which are now in the hands of the draftsmen or engravers. The work as now conducted furnishes all of the information which may reasonably be expected upon maps of the scale adopted.

The Coast and Geodetic Survey has prepared with great accuracy charts representing the territory adjacent to and underlying the Chesapeake waters. From these charts, enumerated in an earlier report, one may acquire all of the information desirable for general knowledge, while under special restrictions more detailed information may be obtained from the manuscript archives of the Federal bureau.

The maps prepared by these two bureaus unfortunately do not cover the entire territory of the state, and there still remain here and there local areas which are found best represented in scattered localized sheets. For general information regarding any of these officially unmapped portions, it is best to make use of the state maps published by Martenet, although these are at present at least ten years out of date. The changes which take place in such a length of time are especially noticeable in maps of the Martenet type, since they deal almost entirely with cultural features and do not attempt the delineation of surface topography. On the Eastern Shore of Maryland, when procurable, the early atlases published about twenty years ago are the most accurate and detailed. The same is also true respecting the northern portions of Cecil, Baltimore and Carroll counties. Harford county has been represented on a wall map which was brought up to date some years ago by Mr. McNair. This, however, seems to be practically out of print.

Although the U. S. Geological Survey has published a map covering the Frederick quadrangle, which includes that portion of Maryland between Parr's Ridge and the Catoctin Mountain, it has been found that this is not up to the usual standard of accuracy. It is, nevertheless, the most accurate yet published, and will soon be greatly improved.

The surface included in the western part of the Frederick sheet and extending westward to North Mountain is represented on maps

published by the Western Maryland Railroad. The best of these is that compiled from the work of the Coast Survey, which was published in 1885.

The present summary of the present status of the accurate mapping of the state clearly indicates that at the present day there is no wholly satisfactory map, or series of maps, upon which to represent the detailed information acquired regarding the physical features of Maryland territory. The work already inaugurated by the present Geological Survey, in coöperation with the U. S. Geological Survey, is rapidly reducing the unmapped portions of the state, and it is hoped that within the course of a very few years sufficient work may be done to furnish material for an adequate representation of the physiography of the state upon a large and uniform scale.

NOTE.—It has seemed desirable in the report on the Maps and Map-makers of Maryland to omit any discussion of the maps and plats of the cities and towns of the state as any adequate treatment of the subject would have greatly swelled the present volume. Much valuable information bearing upon municipal cartography has been collected which could be made the basis of a subsequent report if there should be a demand for it.

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