

GEOLOGICAL OBSERVATIONS OF CAPTAIN JOHN SMITH IN 1607-1614

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The fabulous and famous John Smith (1580-1631), always referred to as "Captain John Smith," has been more highly regarded for veracity in this century than he was in the preceding one (McIlwaine, 1947). There is now a tendency, on the basis of confirmation from various sources, to take Smith's autobiography (1630), including the story of Pocahontas, quite seriously. His claim to notice in any history of early American natural history (Goode, 1901, p. 371) or of early American geology rests upon his observations on natural history, mineral resources, and physical features recorded in his several books on Virginia and New England which appeared between 1608 and 1631.¹

It is hard to realize that the Captain John Smith who was the actual and later the titular leader of the Jamestown colonists was in 1607 a man not yet 27. All his incredible adventures as seaman, soldier, shipwrecked mariner, ambassador, Turkish slave, escapee and traveler in Europe, Turkey, North Africa, and Ireland took place between his thirteenth and twenty-fourth birthdays! When he sailed to Virginia with the settlers it was as one of those who

had invested in the project and not as a hired member of the party.

From Smith's voluminous writings and his compilations of the writings of others, especially of his old companions in arms, Phettiplace and Todkill, it appears that Smith himself early became skeptical about finding precious metals or a route to the Indies. One gets the impression that he felt from the first that the real future of Virginia lay in colonization and the development of trade. His attention to soil types confirms his interest in agricultural resources. One almost feels that he realized that the type of settlement of the Spaniards, based on extraction of precious metals and its necessary exploitation of the natives, was not to be desired for the English. Indeed, he is honest enough on one occasion to write that the hope of finding gold was used only to secure backing for his voyage to New England. He was obviously thoroughly familiar with Thomas Hariot's (1588; White, 1952) sane and sensible report of Virginia (actually North Carolina) resources and appears to have relied more on it than on the rosy compilations of Eden (1555) on Spanish gold.

SMITH'S MAP AND DESCRIPTION

Smith's first book, *A True Relation . . .*, published in 1608 (the first printing does not have Smith's name as author) contains little on obser-

¹ I am much more sympathetic to the viewpoint of Arber (1910) and McIlwaine (1947) about the veracity of Smith than to the carpingly critical view of Brown (1891). I have come to this attitude on topographic and geologic grounds—his geologic and physiographic observations "stand up." To professional historians must be left the assessment of the Smith-Newport administrative antagonism, but there can be no doubt that Smith was right and Newport wrong on the precious metal resources.

vations of natural history and nothing that is not in later, more full accounts. The principal source of information on the Virginia seen by Smith and his associates is the book first published in 1612, *A Map of Virginia, with a description of the Countrey*. . . . The map, whether made by Smith or by Nathaniel Powell or by other members of his party under Smith's direction (Fite and Freeman, 1926, pp. 116-119; Ford, 1924), is a remarkable production considering the conditions under which it was made.² It is tolerably accurate geographically and shows the Indian territories and towns. It clearly indicates which parts are based on actual exploration of the ground and which based on reports. I have not seen this interesting point taken into account elsewhere—it is, however, of importance when discussing Smith's observation of topography and geology.³ The Coastal Plain is shown with almost no relief, but landward from the Fall Line, little hills are shown to mark the more hilly Piedmont. This distinction between Coastal Plain and Piedmont, recognized by Hariot (1588, p. F2; White, 1952, p. 118), is well shown although not described in the text.⁴

The *Description* starts by giving the location of Virginia, landfalls by

which it may be reached, the climate, and then a description of the topography, soil, and the various rocks. In describing the kinds of rocks Smith makes very clear that glistening particles are not gold but may easily be so mistaken (1612, p. 3; 1910, p. 49).⁵

The mountains are of diverse natures, for at the head of the Bay the rocks are of a composition like milstones. Some of marble, &c. And many peeces of christall we found as throwne downe by water from the mountaines. For in winter these mountaines are covered with much snow, and when it dissolveth the waters fall with such violence, that it causeth great inundations in the narrow valleyes which yet is scarce perceived being once in the rivers. These waters wash from the rocks such glistening tinctures that the ground in some places seemeth as guilded, where both the rocks and the earth are so splendent to behold, *that better judgments then ours might have been perswaded, they contained more then probabilities.*

The vesture of the earth in most places doeth manifestly prove the nature of the soile to be lusty and very rich. The colour of the earth we found in diverse places, resembleth *bote Armoniac, terra sigillata ad temnia*, Fullers earth, marble, and divers other such appearances. But generally for the most part the earth is a black sandy mould, in some places a fat slimy clay, in other places a very barren gravell. But the best ground is knowne by the vesture it beareth, as by the greatnesse of trees or abundance of weedes, &c.

The country is not mountainous nor yet low but such pleasant plaine hills and fertile valleyes, one prettily crossing an other, and watered so conveniently with their sweete brookes and christall springs, as if art it selfe had devised them.

² Brown's (1891) denial of Smith's authorship of the map carries little conviction. The reproduction of the manuscript map he exhibits to show how crude Smith's work probably was is not at all convincing. Many an excellent map is produced by a competent cartographic draftsman from just such rough notes. This is especially true if the author of the map is at hand to confer with cartographer and engraver as the map develops.

³ Reproductions of the map are given by Arber (1910), Ford (1924) and Fite and Freeman (1926).

⁴ Smith's map is not the first to show Coastal Plain and Piedmont. Hariot's map of "Virginia" of 1588 (Lorant, 1946, pp. 274-275) shows a hilly region inland from the coastal region. Le Moyne's map of "Florida" of 1565 (?) (Lorant, pp. 34-35) shows hills beyond a coastal region, placed on the map probably from hearsay.

⁵ Each reference to Smith's writings will be given both to the first edition and to the much more accessible Arber edition of 1910.

The spelling and punctuation of the original are retained, except for the long "s" which not even Arber reproduced; and, when required, the substitution of initial "u" for "v", of medial "v" for "u" and of "j" for "i." I feel justified in making these changes because these quotations are for geologists rather than for bibliographers who will consult the original anyway. (The generally rigid, rather than capricious, usage of these letters by early printers is described by McKerrow, 1928, p. 310). Those few comments I have thought necessary to make within the quotations are shown by square brackets [].

The crystalline rocks at "the head of the Bay" are those near Baltimore. The description of soil is probably the first one in English for America. In it Smith clearly recognizes the variation of vegetation with soil types. The *bole Armoniac* and *terra sigillata* are varieties of clay used for pigment and medicine; they are often referred to in writings of the time (Hoover and Hoover, 1912, p. 31, note 10).

After describing the rivers, their valleys and their inhabitants, Smith passes on to a lengthy description of trees, fruits, plants, animals, fishes, and birds. He concludes this summary of the natural history of Virginia by a paragraph on "The Rocks" (1612, p. 15; 1910, p. 61):

Concerning the entrailles of the earth little can be saide for certainty. There wanted good Refiners: for these that tooke upon them to have skill this way, tooke up the washings from the moun-taines and some moskered shining stones and spangles which the waters brought down; flattering themselves in their own vaine conceits to have bin supposed that they were not, by the meanes of that ore, if it proved as their arts and judgments expected. Only this is certaine, that many regions lying in the same latitude, afford mines very rich of diverse natures. The crust also of these rocks would easily perswade a man to beleeve there are other mines then yron and steele, if there were but meanes and men of experience that knew the mine from *sparre* [spar].⁶

We are still uncertain "concerning the entrailles of the earth," although we do know more about rocks at the earth's surface than was known in 1612. Smith is again contemptuously sure that the "shining stones" are not gold. He is disdainful of the "refiners," of whom he

had three besides Captain Newport who also had such pretensions.

It is interesting to note that Smith concludes his own part of the book (1612, pp. 37-38; 1910, pp. 82-83) by castigating those who have spread slanderous stories of hardships in Virginia in terms so similar to those used by Hariot in 1588 (p. A4; White, 1952, p. 117) that it is certain he had Hariot's book (or the Debry or Hakluyt reprints) before him when composing this section.

THE "REFINERS"

It is necessary to distinguish Part 1 of the 1612 *Description* by Smith himself, which is well written and well organized, from Part 2, which is a collection of partly repetitive writings of seven of the Virginia colonists, of varying length, expression, detail, and literacy. They give first-hand information of events and locations at which Smith was not present. They are in a sense the raw data which Smith in part used for his summary in Part 1.

In Chapter III of Part 2, Anas Todkill and Thomas Studly tell of the arrival (Jan. 8, 1608) of a ship commanded by Captain Newport. Todkill and Studly write disapprovingly of Captain Newport and his sailors. Instead of delivering the supplies and returning, the sailors stayed on for 14 weeks, eating up the supplies they had brought for the settlers, interfering with the indian trade, but to quote Todkill (1612, p. 21, 22; 1910, p. 104; the poetry, not found in the 1612 *Description* but added in the *Generall Historie* [1624, p. 53; 1910, p. 408], shows Smith's continuing bitterness toward Captain Newport):

⁶ Smith's last sentence is more comprehensible if we remember "mine" meant "deposit or ore mineral [of]," whence "tell mine from spar" means "tell ore mineral from worthless rock."

But the worst mischiefe was our gilded refiners, with their golden promises, made all men their slaves in hope of recompence. There was no talke, no hope, nor worke, but dig gold, wash gold, refine gold, load gold. Such a brute of gold, as one made fellow [a wag] desired to bee buried in the sandes, least they should by their art make gold of his bones. Little need there was and lesse reason, the ship should stay, their wages run on, our victuall consume 14 weekes, that the Marriners might say, they built such a golden Church, that we can say, the raine washed neare to nothing in 14 daies.

Were it that Captaine *Smith* would not applaud all those golden inventions, because they admitted him not to the sight of their trials, nor golden consultations I knowe not: but I [? Anas Todkill] heard him question with Captaine *Martin* and tell him, except he would shew him a more substantiall triall, hee was not inamored with their durtie skill. Breathing out these and many other passions, never any thing did more torment him, than to see all necessarie businesse neglected, to fraught such a drunken ship with so much gilded durt.

Till then wee never accounted Captaine *Newport* a refiner. Who being fit to set saile for England, and wee not having any use of Parliaments, plaies, petitions, admirals, recorders, interpreters, chronologers, courts of plea, nor Iustices of peace, sent Maister *Wingfield*, and Captaine *Archer* with him, for England, to seeke some place of better imployment.

*Oh cursed gold, those hunger-starved
movers,*

*To what misfortunes lead'st thou all
those lovers!*

*For all the China wealth, nor Indies
can*

Suffice the minde of an av'ritious man.

At the end of the Todkill-Studly section (1612, p. 23-29; 1910, p. 106-108) is a list of those who came on April 20, 1608, in the *Phoenix*. This vessel, which Captain Martin wished to load with "phantasticall gold," finally sailed for England with a cargo of cedar which was what Smith intended from the outset she carry

home.⁷ There were landed from the *Phoenix* 33 "Gent.," 21 "Labourers," 6 "Tailers," 2 "Apothecaries," a "Jeweller," a "Gunsmith," a "Perfumer," 2 "Goldsmiths," 2 "Refiners," 4 other artisans, and "divers others to the number of 120."

The refiners were William Dawson and Abraham Ransacke. Already William Callicut (1612, p. 47; 1910, p. 125) was present and listed as a "refiner." Captain Newport also had pretensions as such and Captain Martin (Brown, 1898, p. 46) was the son of Sir Richard Martin, master of the mint. Yet Newport and Martin, the four refiners, and the two goldsmiths were deluded by the "phantasticall gold" which appears to have been only sand with glittering mica flakes. Throughout his books Smith is always contemptuous of his "refiners" and surely with good reason. They seem to have been far less expert, cautious, conservative, and respected than Captain Vaughan, who was refiner ("minerall man") with Lane and Hariot 20 years earlier, or than the Saxon Daniel, who perished with Sir Humphrey Gilbert a few years before that (White, 1952, p. 119). These refiners with whom Smith was plagued could not have been serious students of Ercker (Sisco and Smith, 1951), Biringuccio (Smith and Gnudi, 1942), or Agricola (Hoover and Hoover, 1912), and knew nothing of the *Probierebuchlein* (Sisco and Smith, 1949).

⁷ But see Beverley ([1705], 1947, p. 31), who reports that this ship did carry micaceous dirt—"a yellow sort of Dust-Isinglass"—with a part load of cedar, and that soon after a second ship sailed with this "supposed Gold-Dust," filling her up with Cedar and Clap-board." The report by Todkill may be interpreted either way. Brown (1898, p. 59) asserts that only "samples of minerals" were taken back in these voyages.

Even a touchstone, used alike by assayers, goldsmiths, and jewellers of that day, unreliable as this instrument is for careful assaying, would have shown them that mica is not gold. Had they been resourceful they could even have used a piece of gold coin for a touch needle (Sisco and Smith, 1951, p. 122). An interesting early confirmation of Newport's "gold," followed by more thorough assays in which the worthless samples "turned to vapore," is quoted from a contemporary letter by Brown (1898, p. 45, 46).

The report of Dr. Walter Russell and Anas Todkill on the "Accidents that hapned in the Discoverie of the bay Chesapeake" makes up chapter 5 of Part 2 of *A Map of Virginia*. They relate some details of a voyage up the Potomac River (1612, p. 33; 1910, p. 113):

The cause of this discovery was to search a glistening mettall, the Salvages told vs they had from *Patawomeck* (the which *Newport* assured that he had tryed to hold halfe silver), also to search what furrres, metals, rivers, Rockes, nations, woods, fishings, fruits, victuals, and other commodities the land afforded; and whether the bay were endlesse, or how farre it extended.

The mine we found 9 or 10 myles up in the country from the river; but it proved of no value.

Much greater detail of the same report is given in the 1624 *Generall Historie*, which includes a bit more geological observation on the travel to the falls of the Potomac and then later up the Quiyough (Occoquan) River to the Fall Line. They found no precious metals, but the unusual method they used to try to catch fish is amusing (1624, p. 58; 1910, p. 417-418):

Hauing gone so high as we could with the bote, we met divers Salvages in Canowes, well loaden with the flesh of Beares, Deere and other beasts; whereof

we had part. Here we found mighty Rocks, growing in some places above the grownd as high as the shrubby trees, and divers other solid quarries of divers tinctures: and divers places where the waters had falne from the high mountaines they had left a tintured spangled skurfe, that made many bare places seeme as gilded. Digging the growne above in the highest cliffs of rocks, we saw it was a claie sand so mingled with yeallow spangles as if it had benee halfe pindust.

In our returne inquiring still for this *Matchqueon*, the king of *Patawomeke* gave us guides to conduct us up a little river called Quiyough, up which we rowed so high as we could. Leaving the bote; with six shot and divers Salvages, he marched seven or eight myle before they came to the mine: leading his hostages in a small chaine they were to have for their paines, being proud so richly to be adorned.

The mine is a great Rocky mountaine like Antimony; wherein they digged a great hole with shells and hatchets: and hard by it, runneth a fayre brooke of Christal-like water, where they wash away the drosse and keepe the remainder, which they put in little baggs and sell it all over the country to paint there bodyes, faces, or Idols; which makes them looke like Blackmores dusted over with silver. With so much as we could carry we returned to our bote, kindly requiting this kinde king and all his kinde people.

The cause of this [voyage of] discovery was to search [for] this mine, of which *Newport* did assure us that those small baggs (we had given him), in England he had tryed [assayed] to hold halfe silver; but all we got proved of no value: also to search what furrres. . . . and what other mineralls, rivers, rocks, nations, woods, fishings, fruites, victuall, and what other commodities the land afforded: and whether the bay were endlesse or how farre it extended.

Of mines we were all ignorant, but a few Bevers, Otters, Beares, Martins and minkes [skins] we found, and in divers places that abundance of fish, lying so thicke with their heads above the water, as for want of nets (our barge driving amongst them) we attempted to catch them with a frying pan: but we found it a bad instrument to catch fish with: neither better fish, more plenty, nor more variety for smal fish, had any of us ever seene in any place so swimming in the water, but they are not to be caught with frying pans.

Some of Captain Newport's actions after January, 1608, are understandable when we realize that he had secret orders "not to return without a lump of gold, a certainty of the south sea, or one of the lost company of Sir Walter Rawley" (1612, pt. 2, p. 42; 1910, p. 121). He also brought a "5 pieced barge" which was to bear him to the south sea after "we had borne her over the mountaines (which how farre they extend is yet unknown)" (*ibid*). The troublesome Captain Newport was unable to carry out any of his secret orders, but he did disrupt the organization and development of the infant settlement.

The narrative by Richard Wiffen, William Phettiplace, and Anas Todkill also recounts the journey of Captain Newport (Smith stayed behind) to Monacan 40 miles beyond the falls of the Powhatan (James) River at the present site of Richmond and the search on the return for minerals. They also recount how William Callicut, "a refiner, fitted for that purpose . . . perswaded us to beleve he extracted some smal quantitie of silver (and not unlikely better stufte might bee had for the digging)" (1612, p. 47; 1910, p. 125, 126). That these men had read of the great riches won by the Spaniards in Richard Eden's *Decades of the New World* in the 1555 or 1577 edition or in one of the editions of Hakluyt is indicated by the conclusion of their report (1612, pt. 2, p. 77, 78; 1910, p. 148):

But to conclude, against all rumor of opinion I only say this for those that the three first yeares began this plantation: notwithstanding al their factions, mutenies, and miseries, so gently corrected and well prevented, peruse the Spanish *Decades*, the relations of *Master Hacklut*;

and tell mee how many ever, with such smal meanes as a barge of 2 Tunnes, sometimes with 7, 8, 9, or but at most 15 men, did ever discover so many faire and navigable rivers, subject so many severall kings people and nations to obedience and contribution, with so little bloud shed.

And if in the search of those Countries, wee had hapned where wealth had beene, we had as surely had it, as obedience and contribution; but if wee have overskipped it, we will not envy them that shall chance to finde it. Yet can wee not but lament it was our ill fortunes to end, when wee had but only learned how to begin, and found the right course how to proceed.

Eight Dutchmen and Poles came with Newport in 1608 (1612, p. 53; 1910, p. 129) to make pitch, tar, glass, and "sope ashes." On his return Newport took "tryals" of these (1612, p. 51; 1910, p. 128). Some of the Dutchmen sold arms to the Indians and joined them for a time (1612, p. 65; 1910, p. 139). "The randavus for all their unsuspected villany" was "the glasse-house, a place in the woods neere a myle from *James Towne* . . ." (1612, p. 80; 1910, p. 150). Thus early in American history came the use of industrial minerals in manufactures.

NEW ENGLAND

Captain John Smith left Virginia for England in 1609, never to return to the colony which would not have survived the rigors of the winters of 1607 and 1608 without his guidance. After several years in England, during which he wrote his famous book on Virginia (1612) and defended himself from stories of his enemies, he returned to British America, but to a more northeasterly part of it. Smith explored briefly the New England coast in 1614, but his return in 1615 was prevented by storms and his capture by the

French. Quite characteristically, during his captivity and upon his return he wrote a book: *A Description of New England* . . . (1616). In the first page of his book, in which he names New England for the first time, Smith gives the reasons for this voyage to America (1616, p. 1; 1910, p. 187):

In the moneth of Aprill, 1614. with two Ships from London, of a few Marchants, I chanced to arrive in *New-England*, a parte of *Amerycia*; at the Ile of *Monahigan*, in $43\frac{1}{2}$ of Northerly latitude; our plot was there to take Whales and make tryalls of a Myne of Gold and Copper. If those failed, Fish and Fures was then our refuge . . .

For our Golde, it was rather the Masters device to get a voyage that projected it, then any knowledge hee had at all of any such matter.

His succinct summary of the explorations, and his estimation of the extent of knowledge of America from Florida northward, is very useful (1616, pp. 3, 4; 1910, p. 189). He mentions the character of the coast south of Pennobscot and contrasts the rocky coast of Maine with the sandy shores of Massachusetts. He generalizes on mineral resources from quite insufficient direct evidence, but his statement shows that he and his party did pay some attention to these matters (1616, p. 9; 1910, p. 193):

From *Pennobscot* to *Sagadahock* [cf. Sagadahoc County at mouth of Kennebec River] this Coast is all Mountainous and Iles of huge Rocks, but overgrown with all sorts of excellent good woodes . . .

Betwixt *Sagadahock* and *Sawocatuck* [? Cape Porpoise] there is but two or three sandy Bayes, but betwixt that and *Cape Cod* very many: especially the Coast of the *Massachusetts* is so indifferently mixed with high clayie or sandy cliffes in one place, and then tracts of large long ledges of divers sorts, and quarries of stones in other places so strangely divided with tinctured veines of divers colours: as, Free stone for

building, Slate for tiling, smooth stone to make Fornaces and Forges for glasse or iron, and iron ore sufficient, conveniently to melt in them. But the most part so resembleth the Coast of *Devonshire*, I think most of the cliffes would make such lime stone. If they be not of these qualities, they are so like, they may deceive a better judgment then mine. All which are so neere adjoining to those other advantages I observed in these parts, that if the Ore prove as good iron and steele in those parts, as I know it is within the bounds of the Countrey, I dare engage my head (having but men skilfull to worke the simples there growing) to have all things belonging to the building [and] the rigging of shippes of any proportion, and good marchandize for the freight, within a square of 10 or 14 leagues. . . .

The description of the geography and natural history of New England is not so smoothly organized as the earlier one of Virginia, but nevertheless is full of information. He apparently did not have an assayer ("mineral man" or "refiner") along on this voyage to New England, but acted as his own assayer. He apparently had had instruction in assaying and probably had instructions along with him. However, we get the impression that Smith really did not expect to find precious metals. Always one to emphasize the more immediate and known resources, such as fish and furs, he knew at first hand about iron ore and knew it could be important to a new colony. At any rate he was sure of iron if not of gold (1616, pp. 20, 21; 1910, p. 201):

Of Mynes of Golde and Silver, Copper, and probabilities of Lead, Christall and Allum, I could say much if relations were good assurances. It is true indeed, I made many trials, according to those instructions I had, which doe perswade mee I need not despair, but there are metals in the Countrey: but I am no Alchymist, nor will promise more then I know: which is, Who will undertake the rectifying [? erecting] of an Iron forge, if those that buy meate, drinke,

coals, ore, and all necessaries at a dear rate gaine; where all these things are to be had for the taking up, in my opinion cannot lose.

In his *Description of New England* Smith included a map which is as remarkable as his earlier map of Virginia. It is the first real map of this part of North America. It does not show the interior as well as the map of Virginia, but it must be remembered that he spent far less time in New England than in Virginia. No special geological implication can be read from the map of New England as can be from that of Virginia.

CONCLUSION

Smith wrote still other books, which, however, are mainly restatements of his earlier works on Virginia and New England. The most important is *The Generall Historie of Virginia, New England and the Summer Isles* of 1624. In a complete study, they must be examined because there is an occasional amplification, amendment, or addition.

In his maps and books about the new land, Smith supplied clear and factual information for English readers. Intelligent Englishmen could no longer hold the extravagant and fantastic ideas of the New World portrayed in the well-known play of 1605, *Eastward Hoe*.

Smith's report and maps indicate he was aware of the existence of a

low region of sand and clay (Coastal Plain) beyond which lay a more hilly belt (Piedmont) with rivers passing from hilly belt to the lower part by falls. Crystalline rock outcropped at falls and upstream from the falls. Mineral resources included clay, building stone, iron ore, limestone, and materials for glass making. Smith's careful and repeated denial of precious metals was a factor in bringing the English to their senses about the prospects of wealth in the new land; already by 1634 Wood, and by 1637 Morton, accepted the very probable nonexistence of precious metals in New England.

John Smith was a keen observer of natural history but, unlike Hariot, his scientific observations were only incidental to his major activities as soldier, sailor, explorer, administrator, colonizer, and writer. Less credulous than most, he realized that in America the English had a world primarily for settlement rather than for exploitation of any precious metal. He shrugged off precious metals as unimportant, as compared to fertile soil and fundamental resources of iron and fuel to smelt it. He had the keen eye of the successful soldier for topography, but not the scholar's contemplative consideration of its continuity and origin, as did Hariot. He had the scientific spirit of true report of data. He left to others analysis and theory.

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