

ON MATHEMATICAL CULTURE AND COMMUNITY: IMAGERY OF DAVID EUGENE SMITH, 1911

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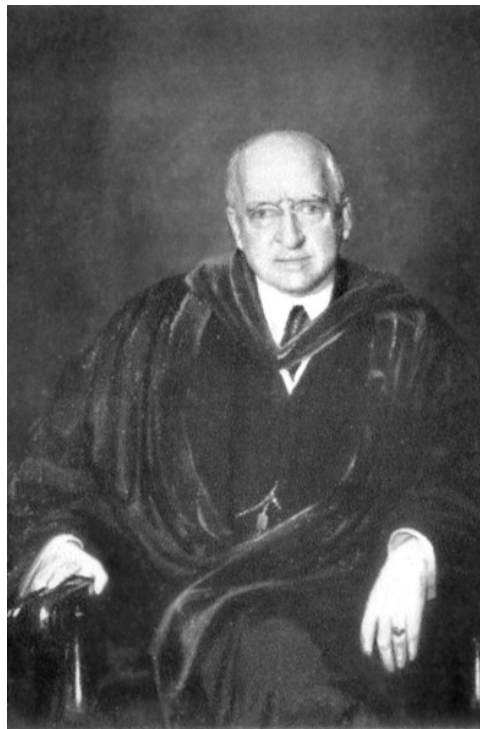
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Abstract. Some little-known words by David Eugene Smith—American mathematician, educator, and historian of mathematics—appeared well over a century ago. The passages presented provide an appealing general description of mathematical engagement and give a sense of the community in which it takes place, both of which resonate in our modern day tertiary sector.

1 Introduction and Background

David Eugene Smith (1860–1944) had an impressive and varied career, serving as President of the Mathematical Association of America during 1920–21 and Vice-President of the American Mathematical Society in 1922 among those duties he took on. As a pioneer in the development of mathematical education, he held the office of President of the International Commission on the Teaching of Mathematics between 1928 and 1932 and, as a distinguished historian of mathematics, he co-founded both the History of Science Society in 1924 (of which he was elected President in 1927) and the journal *Scripta Mathematica* in 1932.



DAVID EUGENE SMITH, LL.D.
Professor of Mathematics 1901. Professor Emeritus 1926
Presented by some of his friends
Painted by Leo Mielziner

A Portrait of David Eugene Smith by Leo Mielziner (Wikimedia Commons)

1.1 A Brief Biography

Born on 21st January 1860, in Cortland, New York, Smith had a stimulating childhood, learning about the law from his father while his mother—who took him on many visits to museums, art galleries, and historic sites—tutored him in Latin and Greek in which he became proficient. Entering the nearby Syracuse University in 1877, he took a wide range of courses—these lay mainly in the fine arts and humanities, but also included mathematics and law—gaining a bachelor’s degree in 1881, a master’s degree in 1884, and a doctorate in 1887. In 1883 he entered his father’s law firm, and was admitted to the bar in 1884. That same year, however, an invitation to deputise for an absent teacher at Cortland Normal School led him to teach several mathematics courses and as a consequence develop a love for both mathematics and its history during his time there. Becoming ever more engrossed in mathematical education, he gave up his law work and eventually took up teaching positions in Ypsilanti (Michigan) and Brockport (New York). In 1901 he was appointed Professor of Mathematics at the Teachers College, Columbia University (in New York City), where he spent the rest of his working life until retirement in 1926.

An inveterate traveller to Europe, the Middle East, Asia, Africa, and South America, he quickly amassed sizeable collections of mathematics texts (ancient and modern), first editions, rare original manuscripts (European, Middle Eastern, and Oriental), historical artefacts, and mathematical instruments. These remarkable accruals he made available to colleagues and students at Columbia University, before handing over his entire archive to the institution in the early 1930s. He died on 29th July 1944. Smith’s bequeathment is a rich physical resource of much historical substance, affording insight into the development of mathematics and the lives of some of those responsible for its advance across the world. Aside from this, his many and diverse writings, his dedicated committee work within secondary/tertiary educational societies and publishing outlets, and his desire to see mathematical education put on the academic map as a discipline of serious ambition and intellectual depth, combine to form an admirable legacy. Further details of his life and work can be found in [1] and [2], and references therein.

1.2 On *The Teaching of Geometry* (1911)

Over the years, David Smith wrote many books and articles for students, teachers and historians of mathematics (examples are [4] and [5]), and among these was *The Teaching of Geometry* [3]; most of his published texts continue to be available, either in print or on-line. This one, first released in 1911, concluded with a personal *envoi* in which he gave a beautiful account of the humanity of scholarly mathematical endeavour. Its elegance and quiet strength are surely testimony to the emotional intelligence of the author, who used cultivated metaphors for the mathematical journeys taken by professionals to form a subtle observation on the approach adopted towards learned exploration and community culture inside the discipline whose pertinence to us today shows little fading.

In this short note we reproduce it in full—providing a few contextual words on each paragraph—because we believe that it should be better known and enjoyed by students and instructors of mathematics as a fine piece of descriptive narrative which captures something of the essence of the subject and whose message has an enduring quality that possesses resonance and agency. The pace, metre, language and gentle imagery deployed are in contrast to the way that modern-day academic travails are sometimes reduced to meaningless pronouncements and vacuous taglines to which are attached spurious labels. It speaks, too, of a time when things such as education, knowledge, learning, erudition, curiosity and understanding were interpreted to fit early 20th century society as it was, and yet their core elements survive and attest to immutable features of mathematics and its loyal band of adherents.

2 In and Around the Mountains and Valleys . . .

We now come to D.E. Smith’s short essay itself [3, pp. 331–334], being a genuinely edifying one behind which the intent is evident. Led by groups of well-meaning and industrious guides, mathematical travellers are shown the ways, the whys and the wherefores of new research and existing bedrock results to enjoy the fruits thereof. These guides can be thought of as scholars who write textbooks, produce expository articles, or reveal hitherto unknown truths through

their research; they instruct and educate fellow mathematicians, moving the discipline forward and continually reshaping the contours of its landscape:

In the Valley of Youth, through which all wayfarers must pass on their journey from the Land of Mystery to the Land of the Infinite, there is a village where the pilgrim rests and indulges in various excursions for which the valley is celebrated. There also gather many guides in this spot, some of whom show the stranger all the various points of common interest, and others of whom take visitors to special points from which the views are of peculiar significance. As time has gone on new paths have opened, and new resting places have been made from which these views are best obtained. Some of the mountain peaks have been neglected in the past, but of late they too have been scaled, and paths have been hewn out that approach the summits, and many pilgrims ascend them and find that the result is abundantly worth the effort and the time.

Areas of the discipline long established are appreciated as such; they are held with much pride, and most often with respect for other mathematical fields:

The effect of these several improvements has been a natural and usually friendly rivalry in the body of guides that show the way. The mountains have not changed, and the views are what they have always been. But there are not wanting those who say, "My mountain may not be as lofty as yours, but it is easier to ascend"; or "There are quarries on my peak, and points of view from which a building may be seen in process of erection, or a mill in operation, or a canal, while your mountain shows only a stretch of hills and valleys, and thus you will see that mine is the more profitable to visit."

Self-challenge is always worthwhile, over and above the advice of those around us, in finding one's own personal level of achievement:

Then there are guides who are themselves often weak of limb, and who are attached to numerous sand dunes, and these say to the weaker pilgrims, "Why tire yourselves climbing a rocky mountain when here are peaks whose summits you can reach with ease and from which the view is just as good as that from the most famous precipice?" The result is not wholly disadvantageous, for many who pass through the valley are able to approach the summits of the sand dunes only, and would make progress with greatest difficulty should they attempt to scale a real mountain, although even for them it would be better to climb a little way where it is really worth the effort instead of spending all their efforts on the dunes.

Choosing a line of reduced resistance in mathematical study, especially when forged and encouraged by others, comes with the potential consequence of limitation in our goals:

Then, too, there have of late come guides who have shown much ingenuity by digging tunnels into some of the greatest mountains. These they have paved with smooth concrete, and have arranged for rubber-tired cars that run without jar to the heart of some mountain. Arrived there the pilgrim has a glance, as the car swiftly turns in a blaze of electric light, at a roughly painted panorama of the view from the summit, and he is assured by the guide that he has accomplished all that he would have done, had he laboriously climbed the peak itself.

Mathematics is one of the great intellectual edifices whose summits and peaks offer much reward to those willing to take them on. It recompenses in proportion those whose proverbial bar is set lower, being an elite enterprise for the few while others play a supporting role or else find it an incongruous endeavour:

In the midst of all the advocacy of sand-dune climbing, and of rubber-tired cars to see a painted view, the great body of guides still climb their mountains with their little groups of followers, and the vigor of the ascent and the magnificence of the view still attract all who are strong and earnest, during their sojourn in the Valley of Youth. Among the mountains that have for ages attracted the pilgrims is Mons Latinus, usually called in the valley by the more pleasing name Latina. Mathematica, and Rhetorica, and Grammatica are also among the best known. A group known as

Montes Naturales comprises Physica, Biologica, and Chémica, and one great peak with minor peaks about it is called by the people Philosophia. There are those who claim that these great masses of rock are too old to be climbed, as if that affected the view; while others claim that the ascent is too difficult and that all who do not favor the sand dunes are reactionary. But this affects only a few who belong to the real mountains, and the others labor diligently to improve the paths and to lessen unnecessary toil, but they seek not to tear off the summits nor do they attend to the amusing attempts of those who sit by the hillocks and throw pebbles at the rocky sides of the mountains upon which they work.

Mathematics has an inbuilt integrity whose favours are bestowed only on those working with dedication and purpose. True practitioners neither disguise this nor respect much those who treat it lightly and operate at little more than surface level (in the opening line, the word ‘Geometry’ may be replaced by any other suitable area of mathematics):

Geometry is a mountain. Vigor is needed for its ascent. The views all along the paths are magnificent. The effort of climbing is stimulating. A guide who points out the beauties, the grandeur, and the special places of interest commands the admiration of his group of pilgrims. One who fails to do this, who does not know the paths, who puts unnecessary burdens upon the pilgrim, or who blindfolds him in his progress, is unworthy of his position. The pretended guide who says that the painted panorama, seen from the rubber-tired car, is as good as the view from the summit is simply a fakir and is generally recognized as such. The mountain will stand; it will not be used as a mere commercial quarry for building stone; it will not be affected by pellets thrown from the little hillocks about; but its paths will be freed from unnecessary flints, they will be straightened where this can advantageously be done, and new paths on entirely novel plans will be made as time goes on, but these paths will be hewed out of rock, not made out of the dreams of a day. Every worthy guide will assist in all these efforts at betterment, and will urge the pilgrim at least to ascend a little way because of the fact that the same view cannot be obtained from other peaks; but he will not take seriously the efforts of the fakir, nor will he listen with more than passing interest to him who proclaims the sand heap to be a Matterhorn.

3 Concluding Remarks

It is well over a century since Smith’s thoughts took shape in print. Their relevance is a reminder to us all that there are people whose voices deliver steadfast and meaningful enlightenment; those whose words carry themselves well, sometimes over many years, deserve to remain heard and not to fall silent. The textual canvass filled by Smith is a perfect case in point—here we have a professional mathematician in harmony with his subject, able to satisfy the desire to set down some of his feelings as a concise, enjoyable and insightful piece of hermeneutic writing that stands the test of time.

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