The Eccentric Humanitarian
In Memoriam: Charles E. Aull

by

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THE ECCENTRIC HUMANITARIAN IN MEMORIAM: CHARLES E. AULL

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ABSTRACT. This paper acknowledges the humanitarian contributions of Charles Edward Aull to the NAACP and Virginians for Alternatives to the Death Penalty and briefly discusses his mathematical work and its impact upon mathematics.

Charles (Charlie) Edward Aull (1927-2009) died July 4, 2009. He was a mathematician – a topologist by trade – a teacher, a friend, but more than that, he was a humanitarian.

It's not easy writing about a man you only thought you knew. I discovered so much more about Charlie when I embarked up this mission, a mission I thought was going to be a sad one, but instead is a triumphant one, learning about a man's personal life, a life that I knew little about. To paraphrase an early 19th-century popular Irish traditional anti-war and anti-recruiting song, "Charlie, I Hardly Knew Ye."
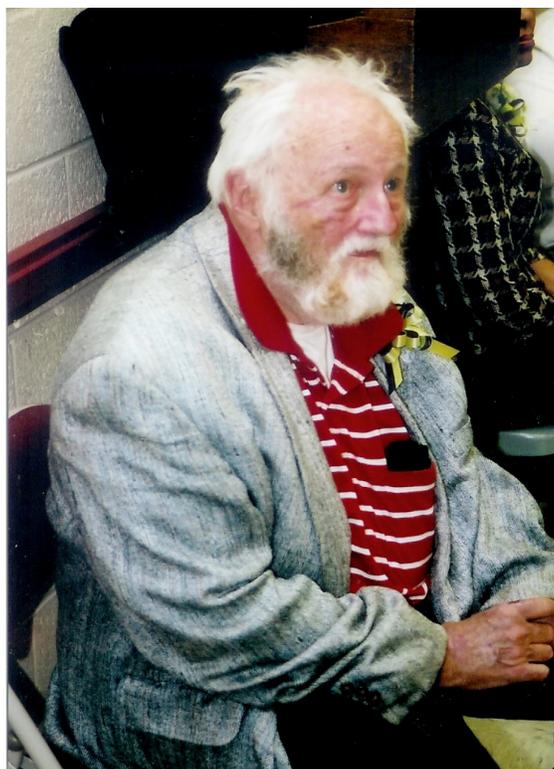
1. EARLY LIFE AND SCHOOLING

Charlie was born September 1, 1927, in Astoria, New York City, the third child of Mary Sullivan and Wilson Aull. James, the first born son, died at age three. Robert (Bob) Thomas (Levittown, New York) was three years older than Charlie, and Nancy (Blacksburg, Virginia) was five years younger.

Charlie Aull
MLK Day 2009
Photo ©Raymond L. Bishop

After brief service with the U.S. Navy at the close of World War II, Charlie went on to earn a Bachelor of Science in Chemical Engineering at Columbia University. He then went to work for Burgess Battery in Indiana. He found the work unsatisfying and decided that a career change was in order. His brother Bob recalls that he was unhappy with the acid burns he kept getting in his clothing.

Charlie changed his career to mathematics, earning a Master's in 1953 at the University of Oregon with his thesis *The impossibility of forming a field from three independent basis elements with coefficients in the field of real numbers*. Charlie's sister believes that he was at the University of Arizona before he entered the Ph.D.

program at the University of Colorado, but this has not been substantiated. He earned his degree in 1962, writing his dissertation *Separation Axioms* in point-set topology under the tutelage of Wolfgang Thron. After teaching at Kent State University (1962-1965), Charlie joined the Department of Mathematics at Virginia Tech in 1965 and taught until his retirement in 1992. He spent several summers at the Institute of Advanced Studies at Princeton University doing research. At Virginia Tech he directed three doctoral students: Douglas E. Cameron (1970), J. D. Wine (1971), and Jane O. Sawyer (1975). It is an interesting fact that these three were students together in his general topology class 1966-67.

2. Charlie as Seen by Others

Douglas Cameron:

> When I came to Virginia Tech I didn't know if I had the ability to do the research necessary to earn a doctorate. Charlie's topology class was a revelation to me, especially his take-home examinations. The last question was always one involving construction of examples and/or proving theorems about a definition. If the definition was from the literature, as at least one was, he would conceal it by changing the terminology.

J. D. Wine:

> The guy lived a life that was an example and taught the same way. He was his own man, in every sense of the word.

Jane Sawyer:

> I can just see very clearly his new suit he bought at the beginning of each quarter that he wore every day. The pants leg became dirty from his shoe as he stood with his left foot on his right leg. The tie became very skinny by the end of the quarter from sliding it up and down but never untying it. Charlie never stopped learning or teaching. He was a great guy.

Virginia Tech Department of Mathematics History:

> In the Mathematics department, the affects [of bud-
> get cuts] were felt in its ability to get approval to
> hire new faculty. Six people retired in 1992 after the
> state of Virginia offered a special retirement package
> to its state workers. The Department was permitted
> to use about half of those vacated positions to hire
> new faculty at the assistant professor level. One of
> the people to retire at this time was Charles Aull,
> who had been a colorful figure in the Department
> for nearly 30 years. His office was notorious for its
> untidy state, and there was some good natured jok-
> ing as to how it might get cleaned out for its next
> occupant. [11]

The author agrees with this statement and cannot think of how,
in 1970, Charlie moved his office from Williams Hall to McBryde
Hall, the new mathematics building. However, regardless of the
mess, he knew where everything was. So also was his room at the
University Club where he lived for many years. Stacks of paperback
books that he had read, many of them westerns (if the author
remembers correctly), hid the lower walls.

Charlie is most aptly described as the stereotypical mathematics
professor, from his rumpled hair, to his partially tucked-in shirt, to
his tie that, upon close inspection, could identify his menu for the
day.

Jack Porter (University of Kansas):

> Charlie was a gentle, kind soul. Charlie and I ex-
> changed reprints and preprints for many years be-
> fore I met him in person. In one of his preprints,
> I noticed a small error and brought it to his atten-
> tion; he quickly fixed it. I was surprised that he
> mentioned my name in the article. From this point
> on, we were good friends.

Donna Zelazny (St. Mary's Catholic Church, Blacksburg):

> He really was an extraordinary gentleman. We miss
> him so much! He made it a point to befriend my two
> youngest children who always came to work with
> me and he called them his buddy and his girlfriend.

They got such a giggle out of it. He was so great with children! He loved to talk to kids in the grocery store or where ever [*sic*] he happened to be and tell them jokes and such. He must have been a wonderful teacher.

Charles Layman (artist and native of Blacksburg):

met Aull when he was a child and recalled joining the professor on prison trips. "He was a blessing to me really. . . . He could just make up songs out of the blue. . . . He was an amazing guy" [9].

3. The Humanitarian

What made Charlie special, however, were his relentless efforts on behalf of the disadvantaged. He was an early member of the Montgomery County Chapter of the NAACP (one of only three white members at the beginning) and Virginians for Alternatives to the Death Penalty. At his funeral, Reverend Glenn Orr, President of the Montgomery County NAACP chapter presented a resolution formally recognizing his support and work in eliminating discrimination. It was noted that a moment of silence in his honor would be included as a portion of the next meeting. In particular, it was remarked that Charlie

was a long standing member of the NAACP, a Silver Life member, serving on various committees, including the Branch Executive Committee, Political Action, Communications and Community Affairs. Dr. Aull was the second recipient of the Nannie B. Hairston Community Service Award for his outstanding contributions to the NAACP and the Community; and was a civil rights activist and leader for many years who fought against segregation and helped to bring positive change to our community. . . .

Nannie Hairston recalled that Charlie became the template by which all future nominees for the award were measured.

A memorial statement of the Virginia Tech Department of Mathematics observed that Charlie

had a strong commitment to visiting those in prison
at Fairlawn and at the Juvenile Detention Home in
Christiansburg. He was able to recruit student help
in this ministry even though riding in Charlie's car
to these places was a nail-biting adventure. Char-
lie had a love for and commitment to St. Mary's
Catholic Church in Blacksburg and the Newman
Community, the Catholic Campus Ministry at Vir-
ginia Tech. His work, however, embraced all faiths.
In April 1995, Charlie was honored at the University
Student Leadership Awards ceremony with a Volun-
teer Spirit award. It's hard to imagine us ever again
having a faculty member as warm-hearted, energetic
and eccentric (in a good way) as Charlie Aull.

Donna Zelazny remembers Charlie's work in a special way:

Charlie also was very involved in Virginians for Al-
ternatives to the Death Penalty and coordinated
visits to the juvenile detention home nearby. He
was very touched by some of those kids and at-
tended their hearings, visited them at the home and
maintained correspondence after they were trans-
ferred/released. Of all of his volunteer work, this
seemed (to me) to be the thing he was most pas-
sionate about. He did everything he could to help
those kids. There were two that I remember in par-
ticular, whom he thought wrongfully accused, that
he spent a good deal of time helping to prepare their
defense. I wish I knew names, but I don't think he
was able to discuss names (because of their ages?).
He used to send letters to the governor pleading for a
pardon for any convict scheduled for execution. He
really did his research on some of those cases and
made sure to remind the governor if there were any
reasons at all to doubt the prisoner's guilt.

I think Charlie was most interested in helping the
youth. He just loved kids! He always tried to at-
tend Mass on campus with the students, he worked

closely with the Campus Ministry and he partici-
pated in many of their projects/ministries.

I'm pretty sure that he was a part of our church's
Haiti ministry. We have a "twin" parish in Haiti
that we help to support. We help sponsor students
and provide lunches.

He also did a Bible study at the local nursing
homes and brought communion to the residents who
couldn't get out to church.

At his wake (or as Hairston calls it "his family"), the serenity
prayer was read: "God grant me the serenity to accept the things
I cannot change; . . . ." However, his friend and colleague Peter
Fletcher was quick to point out that Charlie's

"motto was to fight for the things he knew he really
couldn't change. . . . As you know, Virginia still
has the death penalty today" [9].

Charlie's strong Catholic faith led him to share devotions with
prisoners, as well as tutoring them in mathematics.

Peter Fletcher:

"I admired all things he did. . . . I'll miss his banter
and his unique outlook on life" [9].

In a phone conversation with the author, Charles Johnson, life-
long resident of Blacksburg, business owner, and fellow NAACP
member, recalled that as members of the Human Relations Council
of Montgomery County, they were assigned certain tasks. Together
they went to the National Bank of Blacksburg and spoke with the
president. Charlie observed that there were no black employees
and asked why not. The president replied that no one had applied.
Johnson then produced some completed applications. Charlie told
the president that he was going away for the summer (to visit his
brother and sister, Johnson recalled) and said that if there were no
visible black employees when he returned that he and other Vir-
ginia Tech faculty members would withdraw their funds. Johnson
remembers that a black couple came down from West Virginia (he
believes that the husband was going to be a graduate student at
Virginia Tech) and the wife was hired.

Johnson recalled another incident at a meeting of the local chapter of the NAACP. The organization was short on funds and was not going to be able to meet dues payments and some other expenses. Charlie produced his checkbook, wrote a check for $250.00 to the organization, and the meeting then proceeded with other business.

Charlie's commitment to fight the death penalty apparently didn't draw much support from within the Blacksburg community, according to Johnson, but Charlie continued on his own.

4. The Mathematician

Charlie's mathematics consisted of over fifty articles (either fifty-one or fifty-two depending upon the source) and was basically in five parts: Separation, Countability, Properties of Bases, Embeddings and Extensions, and History.[1]

Separation: This was the first part of his research from 1962–1973 includes four papers, the first of which *Separation axioms between T_0 and T_1* was from his dissertation and is his most accepted, based on results from the Scholar.Google.com which states that his paper has been cited seventy times in addition to being included in the book *Topological Structures* by Wolfgang Thron [10].

Countability: This also includes four papers spanning 1965–1968 and one of them is of note. In *A note on countably paracompact spaces and metrization*, Charlie proved that *Every countably paracompact first-countable space is regular.* This result is an improvement upon the 1929 result of P. S. Alexandroff and P. S. Urysohn that *Every countably compact first-countable space is regular.* This paper has been cited at least thirteen times, one of them in Ryszard Engelking's *General Topology*, where this result is an exercise [8, p. 320].

Properties of Bases: The next phase, 1967–1978, includes seven papers and, again, one of these (*Quasi-developments and $\delta\theta$ -bases* [2]) is cited by Engelking [8, p. 226] . It is an example of a Hausdorff space such that $\mathrm{hcld}(X) = \aleph_0 < \mathrm{hd}(X)$. $\mathrm{d}(X)=$ density of X=inf{| A |:A is dense in X }; $\mathrm{hd}(X)=$hereditary density of X=sup{ d(A): for every subset A of X }; $\mathrm{hcld}(X)=$hereditary closed density of X = sup{d(A): for every closed subset A of X}.

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[1]This is the author's breakdown.

Embeddings and Extensions: The author thinks that Charlie's study of bases led him to his study of embeddings which basically dominated his topological research from 1975 to 1990. There are fourteen papers in this category.

There were other mathematical papers (twenty-odd in all) and one of them is of note because of the interest that it attracted. *A generalization of a theorem of Aquaro* [1] has been cited thirty-one times. In this paper, the concept of a $\delta\theta$-refineable space is defined and is used to improve a result of Giovanni Aquaro; John M. Worrel, Jr., and Howard H. Wicke; and F. B. Jones concerning the compactness of countably compact spaces.

History: While the history of topology pervaded Charlie's mathematical life from the beginning (most likely influenced by his advisor who included much of it in his topology text), Charlie only wrote three papers on the subject and was co-editor of a three volume collection of papers on the history of general topology. *The Handbook of the History of General Topology* [4], was edited by Charlie and Robert Lowen, but it was really Charlie's baby. Lowen told the author that he and Charlie never met but communicated by email and telephone; he said he was associated with the project because he was the one with the publisher contact and had a student who could see that everything was properly formatted.

An interesting comment from the review of Volume 2 written by Ubiratan D'Ambrosio [7] notes,

> Overall, the stated goal of this Handbook is best understood if we read the three pages [*sic*] paper [in] which Douglas E. Cameron . . . recognizes that his interest in the history of mathematics came while [*sic*] his doctoral advisor, Charles E. Aull, enticed him to look into the human facet of mathematicians.

Douglas Cameron:

> Charlie asked me to write this article and I gladly did so because it honored him. However much I have contributed to the history of mathematics (and to mathematics itself) is because of Charlie. One of the things that I am proudest of is the picture I took of R. H. Bing, Jun-iti Nagata, and Yu. M. Smirnov, at the Moscow Topology Conference held in 1979. If it

wasn't for Charlie Aull (and my wife who had always wanted to visit Russia), there would be no picture of these three landmark mathematicians because I wouldn't have been in Moscow to attend that conference. To my knowledge it was the first and only time that the three men credited with discovering the metrization theorem were together and no one else took a picture.
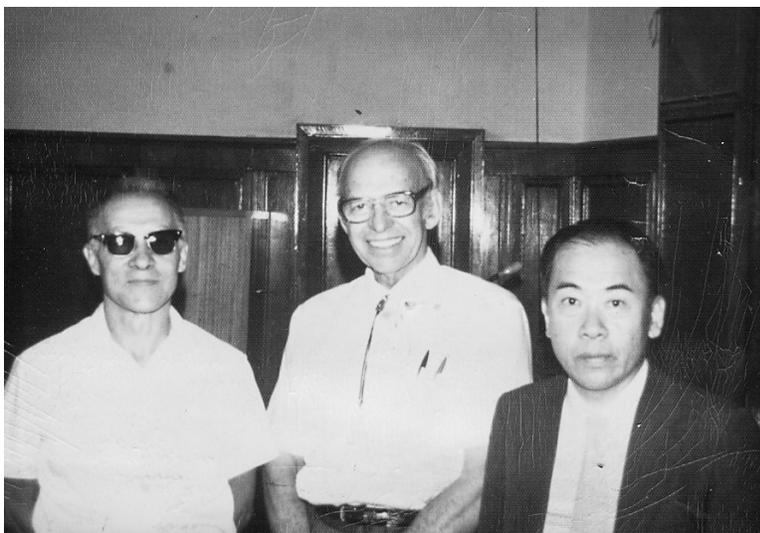
From left to right Smirnov, Bing, Nagata [6]

One of Charlie's interests historically was genealogy of mathematics and one of his papers (*Some genealogies in rings of continuous functions* [3]) was concerned with this subject. Thus, the author feels it is only appropriate to conclude this article with at least part of Charlie's (inverted) family tree which was obtained from MathSciNet:

Charles E. Aull
|
Wolfgang Thron
|
Walter Leighton, Jr.
|
H. C. (Harold Calvin) Morse
|
George David Birkhoff
|
E. H. (Eliakim Hastings) Moore
|
H. A. (Hubert Anson) Newton
|
Michel Chasles
|
Siméon Denis Poisson
/ \
Joseph Louis Lagrange   Pierre-Simon Laplace
| |
Leonard Euler   Jean Le Rond d'Alembert
| |
Johann Bernoulli   unknown

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[1] C. E. Aull, *A generalization of a theorem of Aquaro*, Bull. Austral. Math. Soc. **9** (1973), 105–108.

[2] ———, *Quasi-developments and δθ-bases*, J. London Math. Soc. (2) **9** (1974/75), 197–204.

[3]   ——— , *Some genealogies in rings of continuous functions*, in Rings of
      Continuous Functions (Cincinnati, Ohio, 1982). Ed. Charles E. Aull. Lec-
      ture Notes in Pure and Applied Mathematics, 95. New York: Dekker, New
      York, 1985. 1–5

[4]   C. E. Aull and R. Lowen, eds., *Handbook of the History of General Topol-
      ogy*. 3 vols. Dordrecht: Kluwer Academic Publishers, 1997-2001.

[5]   C. E. Aull and W. J. Thron, *Separation axioms between T_0 and T_1*, Nederl.
      Akad. Wetensch. Proc. Ser. A **65** = Indag. Math. **24** (1962), 26–37.

[6]   Douglas E. Cameron *Photo: Metrization*, Amer. Math. Monthly. **89** (1982),
      240.

[7]   Ubiratan D'Ambrosio, *Book review: Handbook of the History of General
      Topology, Volume 2*, TopCom **7** (2002), no. 1.
      Available at http://at.yorku.ca/t/o/p/d/41.htm

[8]   Ryszard Engelking, *General Topology.* Translated from the Polish by the
      author. 2nd ed. Sigma Series in Pure Mathematics, 6. Berlin: Heldermann
      Verlag, 1989.

[9]   Mary Hardbarger, "Former Tech professor remembered," *Roanoke Times*
      10 July 2009.

[10] Wolfgang J. Thron, *Topological Structures.* New York-Toronto, Ont.-
      London: Holt, Rinehart and Winston, 1966.

[11] University Archives of Virginia Tech. *A History of the Mathematics De-
      partment at Virginia Tech: 1872-1995. Chapter 5. The Hahn Years and
      Beyond: Part 2 – After Hahn.*
      Available at http://spec.lib.vt.edu/archives/math/mthhst5b.htm

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