Hanna Neumann:
a mathematician in difficult times

- **Hanna Neumann (1914–1971)**

- **Difficult times**

- **Hanna Neumann, mathematician**

Hanna Neumann 1914–1971

Hanna [Johanna] von Caemmerer b. February 1914 in Berlin

Studied mathematics: Berlin 1933–37, Göttingen 1937–38
Moved to Cardiff and married B. H. Neumann 1938
Used Hanna Neumann as her name from then on

DPhil. Oxford 1941–43; DSc. Oxford 1955

University [College], Hull 1946–1958
Manchester College of Science and Technology 1958–1963
Australian National University 1963–1971
Elected Fellow of the Australian Academy (FAA) 1969

Died November 1971 in Canada (on a lecture tour)

Hanna von Caemmerer: early years

Hanna [Johanna] von Caemmerer b. 12 February 1914

Never knew her father (historian, died in the first month of war)

Mother Käthe, 'Mutter' to her and our family, brought her family up in severely straitened circumstances; children contributed by coaching

Elder brother Ernst later became professor of international law

Elder sister Dora later became head of German social work system after 1939–45 war

Difficult times: the inter-war period

Hanna joined Berlin University (Humboldt University) Easter 1932 for the Sommersemester

Met B. H. Neumann, who left Berlin for Cambridge in August 1933; became secretly engaged at Easter 1934

Mathematically excellent student; also politically very active anti-Nazi

Passed Staatsexamen August 1937; moved to Göttingen to work with Helmut Hasse (Number Theory)

Hanna von Caemmerer (*c.* 1935)

Difficult times: wartime, I

Hanna moved to Cardiff and married B. H. Neumann in 1938;
daughter Irene born August 1939

As 'enemy aliens' the couple was required to leave Cardiff in June
1940 after German forces overran Belgium (May 1940) and
threatened to cross the Channel

A week later BHN interned on Isle of Man;
after a few months he joined the Pioneer Corps

Hanna found lodgings in Binsey (on banks of Isis);
son Peter born December 1940

In Summer 1941 Hanna applied to Oxford University through the
Oxford Society for Home Students (now St Anne's College)
With special fee remissions for refugees, she matriculated
31 October 1941.

Difficult times: wartime, II

BHN, Cardiff *c.* 1940

Hanna with children,
Binsey, late 1941

Difficult times: wartime, III

Late 1941 started work for Oxford DPhil; Supervisor Olga Taussky-Todd; Advisor Eleanor Plumer, Principal of Society for Home Students

Moved into caravan parked in farmyard of Charity Farm, Littlemore, December 1942

Irene, Peter, caravan, farmyard (April 1943)

Typed her thesis, sometimes by candlelight, sometimes out in sunshine while children played in farmyard

Thesis 'On Free Products of Groups' submitted 12 June 1943; police permitted return to Cardiff on 28 July 1943

Third child, Barbara, born November 1943

6

Difficult times: wartime, IV

 "The work for the thesis proceeded smoothly enough; arrangements made for me were considerate: a weekly (or less) visit to my supervisor, Dr Olga Taussky-Todd, in the evenings; once or twice a term an interview with my tutor at the College. I would take the children (in a side-car attached to my bicycle), and undergraduates would play with them in the common room until I returned."

[HN: autobiographical ms for Australian Academy, 28 July 1969]

Postwar recovery, I

BHN finished military service late 1945; started as Lecturer at University College, Hull early 1946; head-hunted to Manchester September 1948

Fourth child, Walter, born January 1946.

Summer 1946 Hanna won appointment to Hull as Assistant Lecturer in Mathematics; promoted to Lectureship in 1948, Senior Lectureship in 1955 (after award of Oxford DSc)

Fifth child, Daniel, born April 1951

Postwar recovery, II

"Now I hear that most likely the Department of Mathematics there [Hull] will need an Assistant Lecturer in Oktober [*sic*]. Also, the chances to find full–time domestic help there seem to be reasonably good, so that I am thinking of applying."

[Extract from letter, HN to Miss Plumer, 29 June 1946, seeking a letter of reference. Archives of St Anne's College, Oxford.]

Difficult times: five children, I

Irene and Peter, May 1951

Difficult times: five children, II

Barbara and Walter, May 1951

Difficult times: five children, III

Hanna with Daniel, May 1951

August 1939: Irene

December 1940: Peter

November 1943: Barbara

January 1946: Walter

April 1951: Daniel

From September 1948
Bernhard away in
Manchester half the year

More of her own words

[...]. So I started, in Hull, encouraged and helped by Bernhard, who took it as a matter of course that both, our work and our children, were joint and shared responsibilities. It was then, at last, that we started working together.

Hanna Neumann, mathematician, I

Her greatest contributions:

- Structure of free products of groups with amalgamation

- The Hanna Neumann Conjecture on the best upper bound for the number of generators of an intersection of two finitely generated subgroups of a free group—only recently (2011) proved: "Shortly after Mineyev's proof appeared, Warren Dicks simplified it down to a couple of pages [...]. Dicks also provides an appendix to the present memoir, simplifying the author's proof of the SHNC down from about 100 pages to 13." [MathSciNet review of memoir by Joel Friedman.]

- Varieties of groups—articles and important monograph

Hanna Neumann, mathematician, II

She was not only a great research mathematician, but also a great lecturer and teacher.

She taught algebra, analysis, geometry, at every level.

Major influence on foundation of the **Australian Association of Teachers of Mathematics (AAMT)**

Recognised in Australia through
    Hanna Neumann Building at **ANU**, Canberra
    Hanna Neumann Memorial Lectures at **AAMT** annual meeting
    Hanna Neumann Lectureship est. 2010 by **Aust. Math. Soc.**

Hanna Neumann 1914–1971

Hanna Neumann, FAA (1969)