From “Fuel Cell Systems Explained” 2nd Ed., by Larminie and Dicks

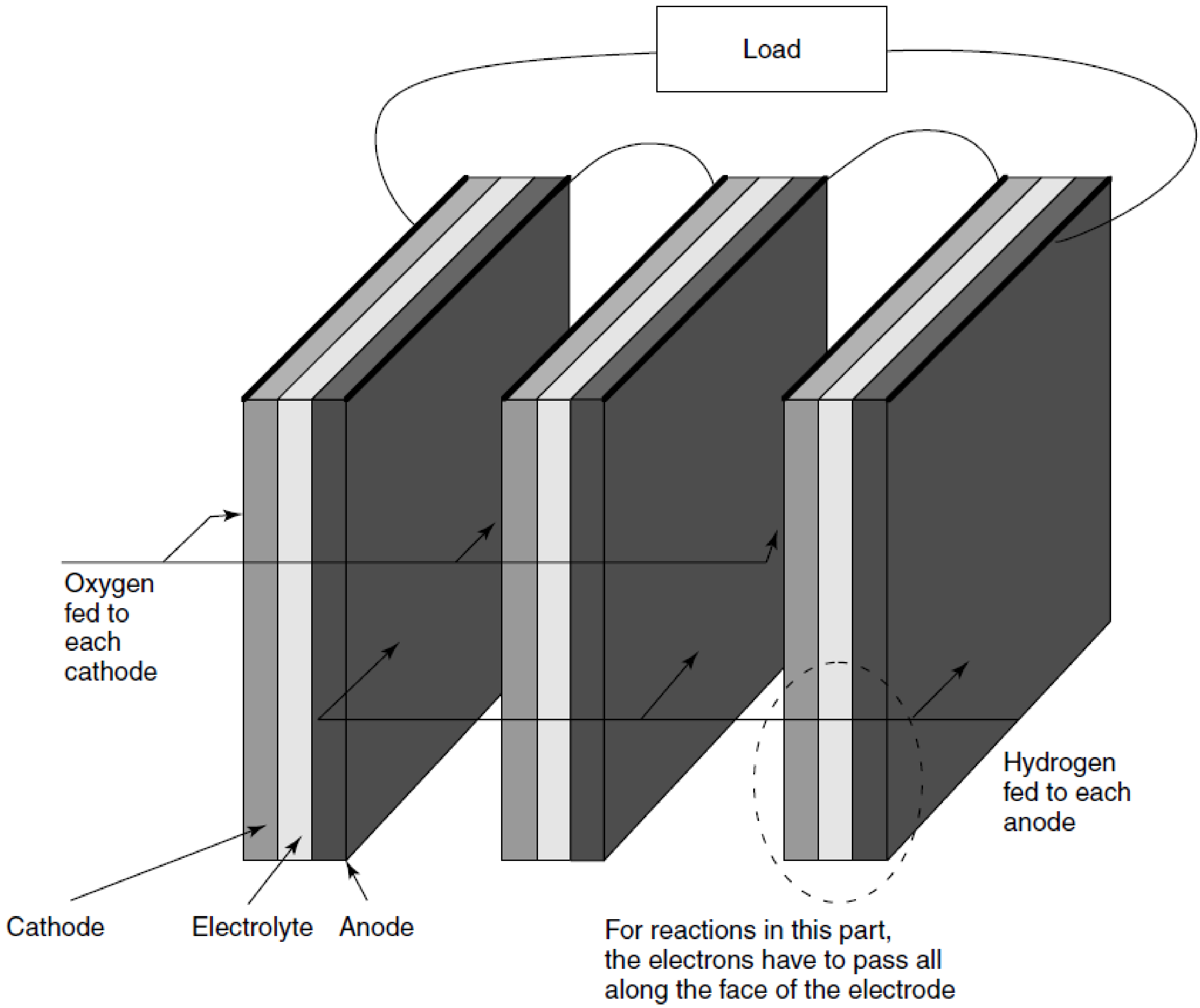


**Figure 1.7** Simple edge connection of three cells in series.

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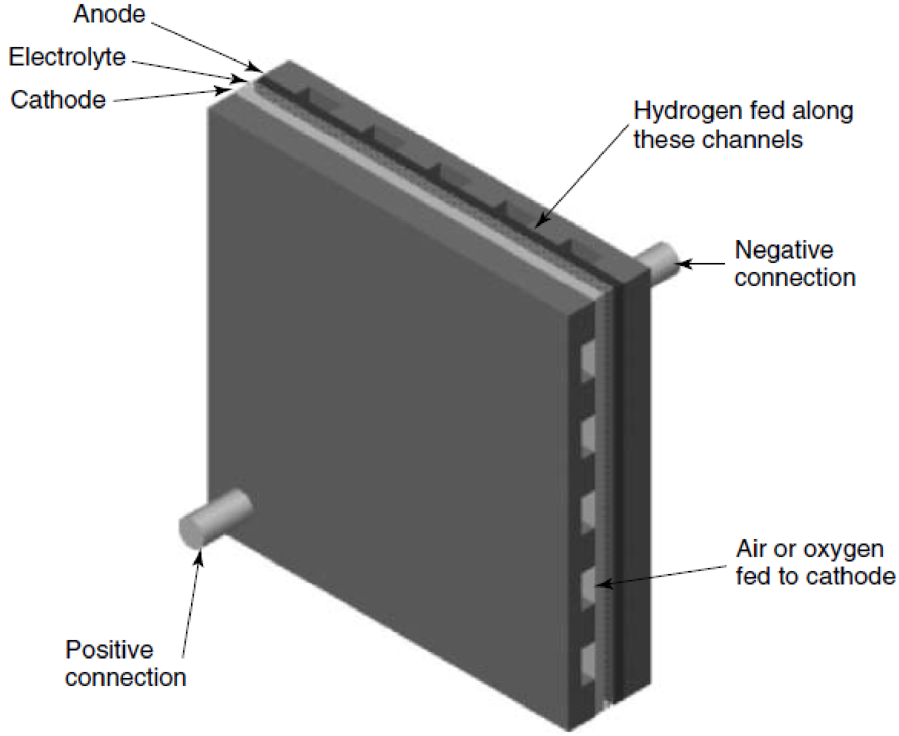


**Figure 1.8** Single cell, with end plates for taking current from all over the face of the electrodes, and also supplying gas to the whole electrode.

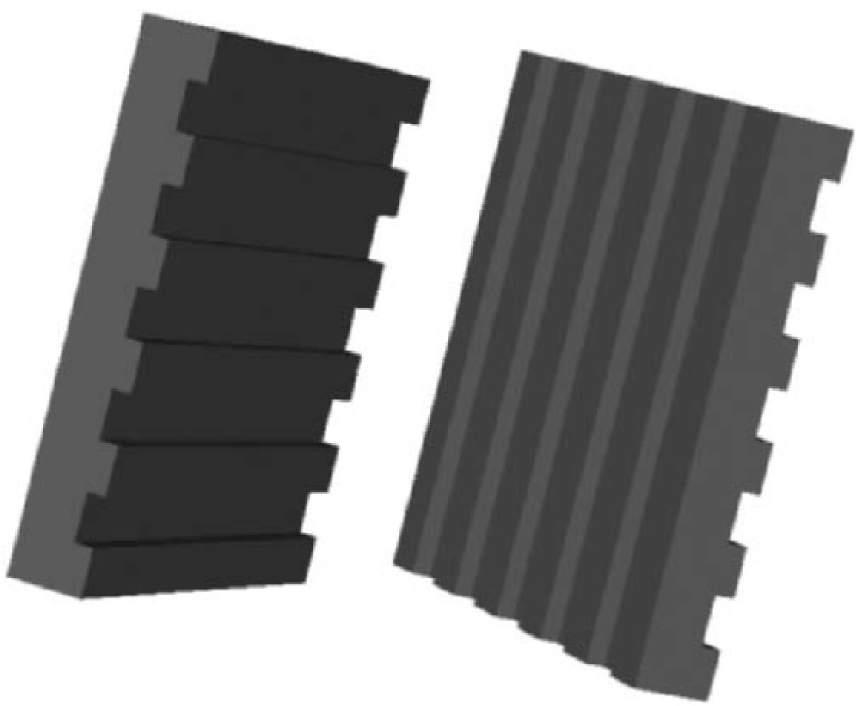

**Figure 1.9** Two bipolar plates of very simple design. There are horizontal grooves on one side and vertical grooves on the other.

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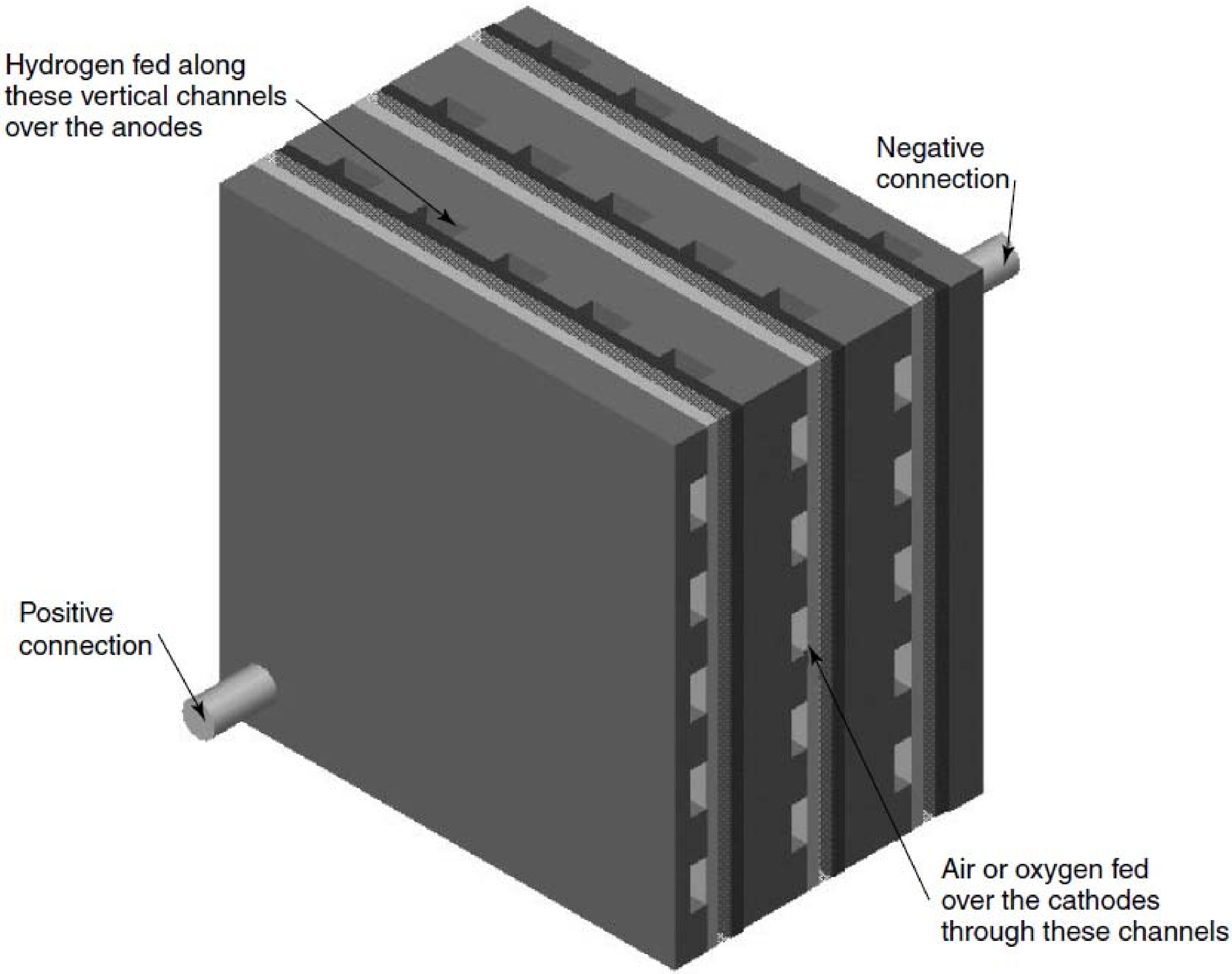


**Figure 1.10** A three-cell stack showing how bipolar plates connect the anode of one cell to the cathode of its neighbour.

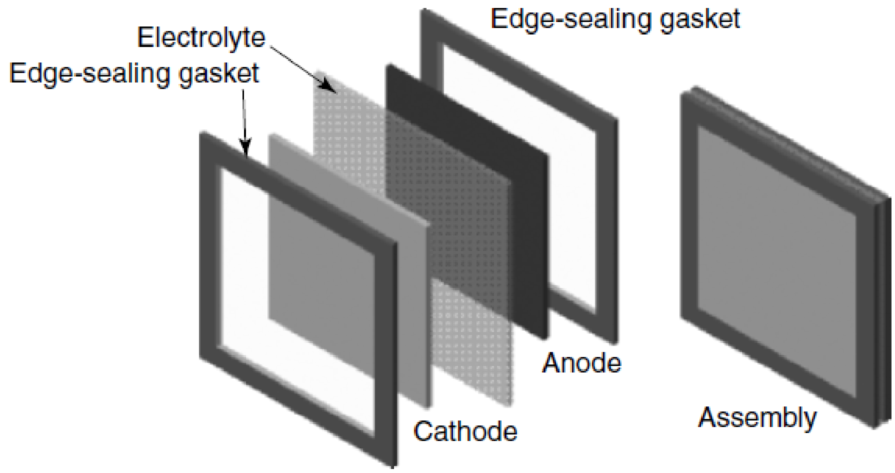


**Figure 1.11** The construction of anode/electrolyte/cathode assemblies with edge seals. These prevent the gases leaking in or out through the edges of the porous electrodes.

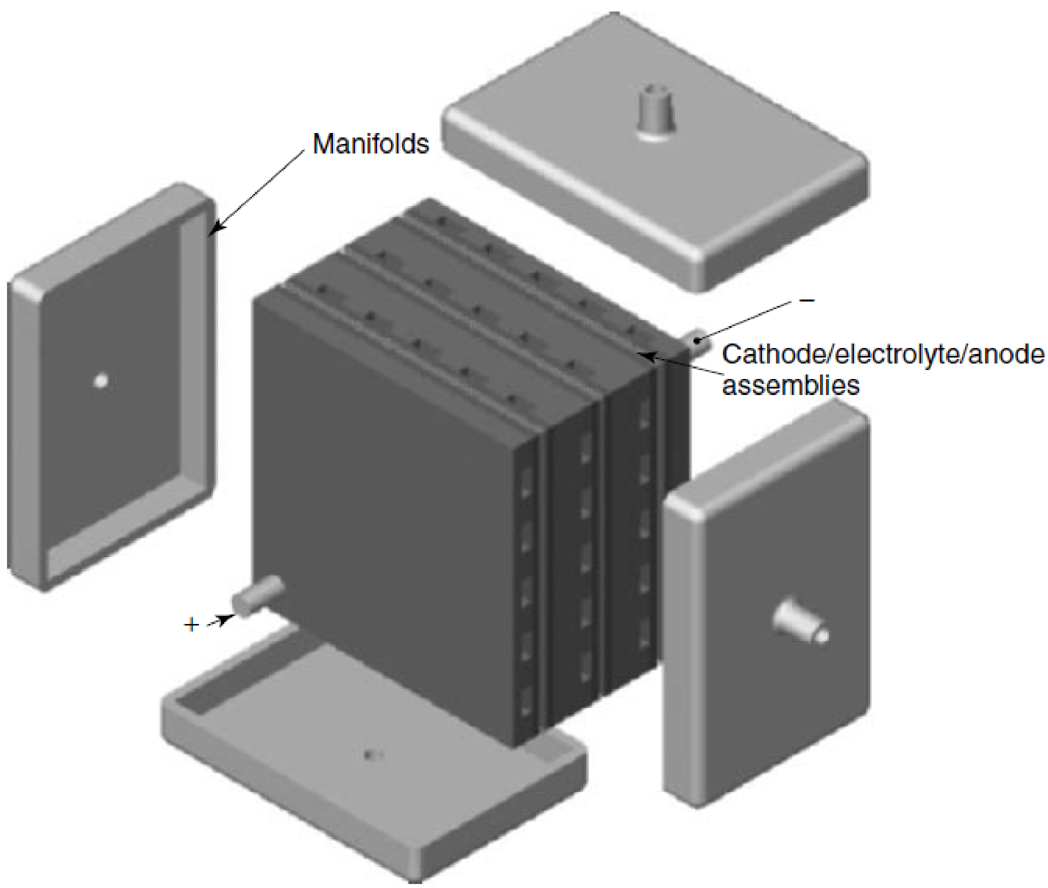


**Figure 1.12** Three-cell stack, with external manifolds. Unlike Figure 1.10, the electrodes now have edge seals.

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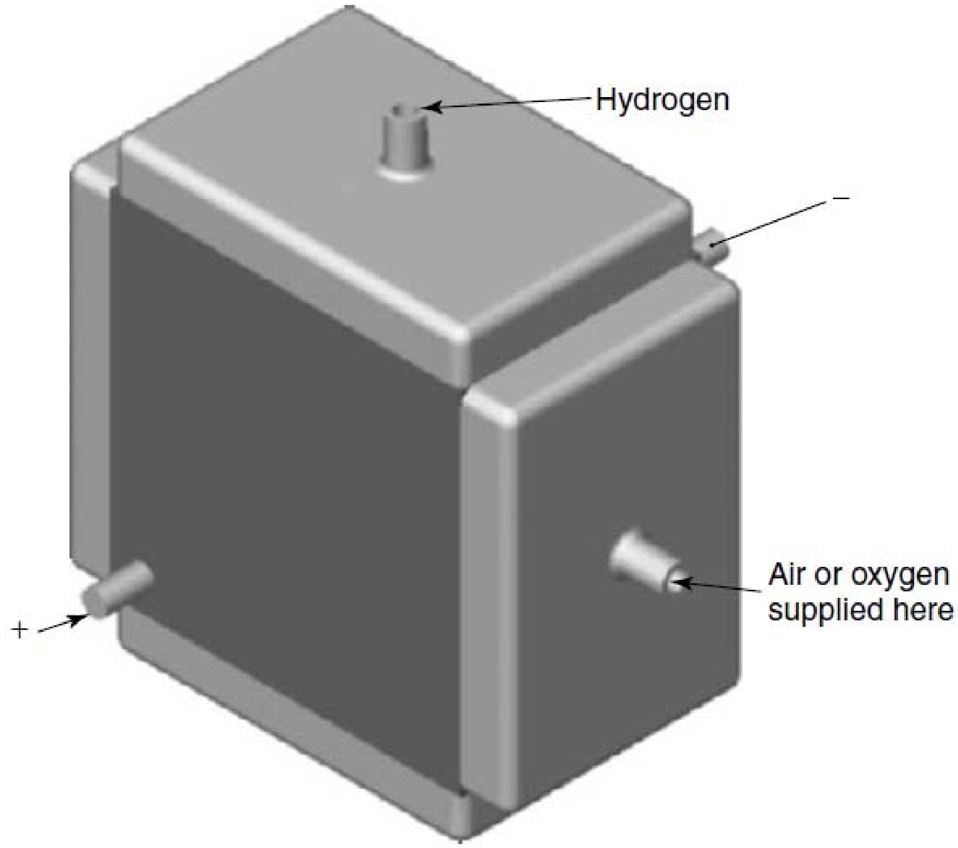


**Figure 1.13** The external manifolds are fitted to the fuel cell stack. Note that no provision has been made for cooling – see Section 1.4.

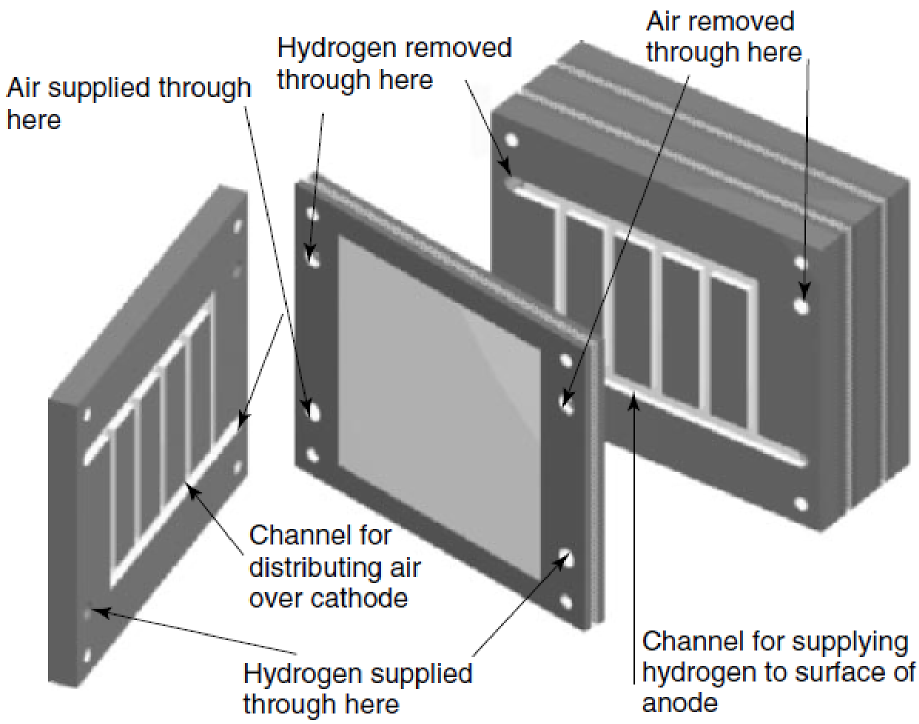


**Figure 1.14** Internal manifolding. A more complex bipolar plate allows reactant gases to be fed to electrodes through internal tubes. (Picture by kind permission of Ballard Power Systems.)

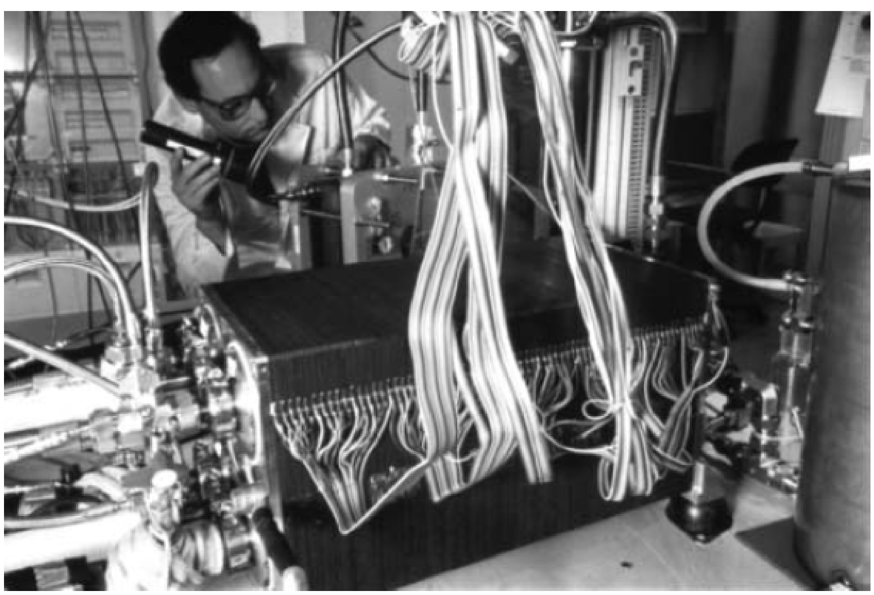

**Figure 1.15** Photograph of a fuel cell stack under test. The voltage of each of the approximately 60 cells in the stack is being measured. Note the carefully engineered end plates. (Photograph reproduced by kind permission of Ballard Power Systems.)

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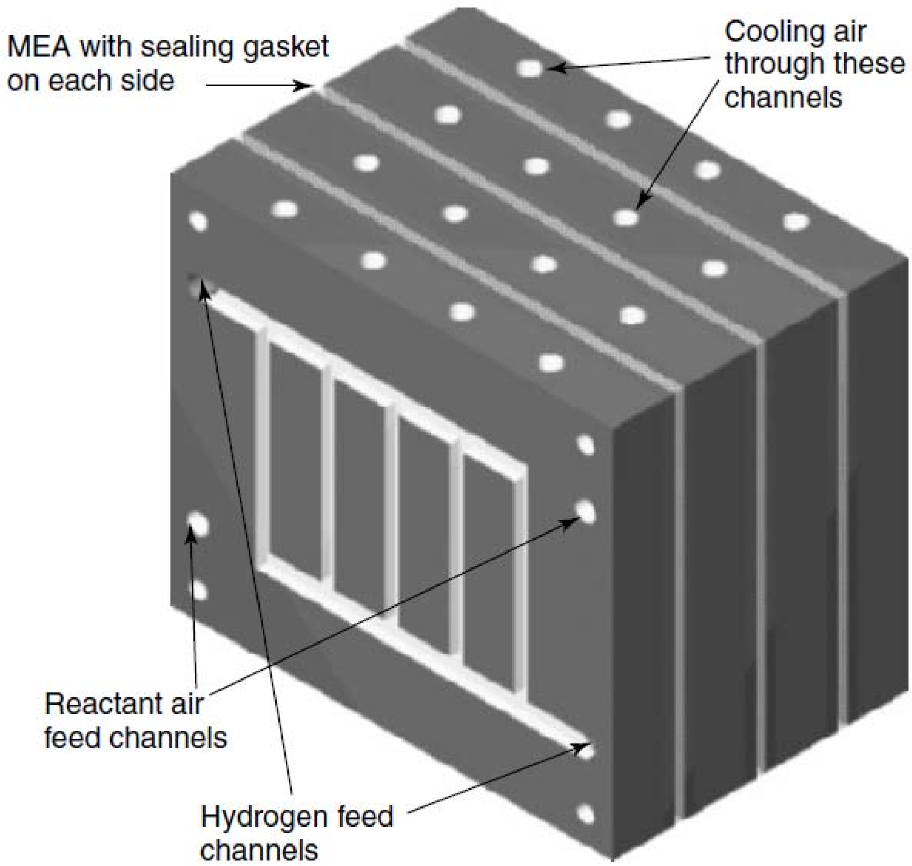


**Figure 4.16** Three cells from a stack, with the bipolar plate modified for air cooling using separate reactant and cooling air.