METEOROLOGY AT THE UNIVERSITY OF ABERDEEN OVER THE CENTURIES

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No doubt people have been trying to understand the weather since prehistoric times. As every geography student learns, weather and climate depend on where you are in the world. Generalisations are hard to come by. The weather is a complex physical system and prior to having the right tools to make progress there was little more than superstition, astrological references and folk sayings to go by. At their best they were attempted summaries of experience. Some sayings are a marginal improvement on predicting that tomorrow’s weather will be similar to today’s but, in short, the accuracy of forecasts was a matter of chance rather than understanding. The tools needed to understand the weather are first and foremost accurate measurements of what constitutes the weather: temperature, pressure, precipitation, sunshine, wind, humidity, visibility. Secondly an understanding of how the physical state of the atmosphere gives rise to the gamut of weather we experience. Get all that right and you have the science of meteorology.

Wind direction was probably the first element that could be measured well, relating it to the compass points. That goes back millennia. Rainfall may have been measured on occasions, but as far as I know no useful records from classical times survive. Of course we can deduce aspects of weather in ancient times from natural proxies, even the clothes that people wore in everyday life, and especially extreme weather from accounts of droughts and floods. All that said, the science of meteorology had no chance of starting until the components of weather could be measured reasonably well. Accurate barometers came in the 17th century, pioneered by Torricelli. Accurate thermometers with a means of calibration were developed in the early 18th century by Celsius, Fahrenheit and others. It’s not surprising then that we find the first evidence of meteorology in the University of Aberdeen in the 18th century. In the inventory of the instruments of Professor Copland who taught Natural Philosophy (Physics) we find in his observatory a ‘pluviameter’ (a rain gauge) and mountain barometers, one of which we still have (made by Miller of Edinburgh around 1800 and shown on the next page: Ref ABDNP:200035a). In the classroom he showed De Luc’s

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1 A collection of some of the better sayings can be found in John S. Reid Weather Lore Scots Magazine, vol. 107, pp 148 - 153 (1979)
hygrometry (measuring humidity) and of course thermometers. Students were at least seeing basic meteorological tools. Weather and climate were talked about in Natural History lectures. So - was meteorology Natural History (a second-year subject) or Natural Philosophy (a third-year subject)? It seems that measurement was Natural Philosophy, weather Natural History.

To understand the weather, careful measurements need to be made over a period of years to cover the range of variation. There is no evidence that this happened in Aberdeen prior to the early 19th century. William Knight included meteorology in his Natural History lectures in 1810 but he later succeeded Copland in Natural Philosophy and from 1825-1836 regular records of rainfall, pressure and temperature were made. Dipping into his notes of the 1840s one can find him talking to his class about meteorological processes involving evaporation, dew, mist, clouds, rain, snow and hail, air temperature and wind speed. This strongly linked the constituents of weather to physics. The Professor of Mathematics, John Cruickshank kept a log for many years of visibility up the Dee valley. These efforts were more a sign of interest in meteorology as a developing science than the groundwork for future understanding. Pressure to make advances in meteorology was stronger from professions whose lives depended on the weather, such as those whose business was at sea.

In 1867, the Meteorological Committee, which had taken over the Meteorological Department from the Board of Trade, decided to set up a national network of observing stations that would report back to headquarters at Kew, by telegraph. It was originally planned to have eight observatories but owing to the lack of funds it was decided to reduce the number to six, Aberdeen being one of the two omitted. However, Aberdeen considered it had a very strong claim because of its position in the country and the facilities it offered. Professor David Thomson at King’s College was a keen supporter. He corresponded with Balfour Stewart, Secretary of the Meteorological Committee at Kew. Stewart asked, among other things, will the instruments be perfectly safe from attacks of boys or mischievous persons? Having been assured, it was agreed in October 1967 that Aberdeen would be one of the national stations. Mention was made of an anemometer for wind speed and direction, a recording thermograph and barograph. A grant of £250 per year would cover all costs, including that of an observer. The station was established in 1868 at the top of the Cromwell Tower. Thomson assured Balfour Stewart that in the observer’s absence he would take the readings and send the results to Kew. In fact in October 1868 he had to tell the Senate that he was compelled to leave Aberdeen without delay, and to spend the winter in a better
climate. The observatory survived. Aberdeen became one of the seven observatories in our first national meteorological network. Indeed, it was one of the first national networks in the world.

View of the top of the Cromwell Tower showing the conical domes of the astronomical observatory and the anemometer behind on a small tower. Photo JSR circa 2013.

The observatory at King's College would remain of national importance for some 80 years. AEM Geddes\(^2\) has given some details of the early history and I have drawn on his account in places. The observatory supplied photographic records of pressure and temperature, the cistern of the barometer being approximately 87 ft above mean sea level. Anemograms were obtained from a Robinson cup-anemometer which, as the Meteorological Report of 1870 records, ‘was erected on the roof of the building at a height of 72 ft from the ground, and well exposed on all sides’. Continuous records of rainfall were obtained by means of the Met Office standard Beckley raingauge situated near the building at ground level. Later, in 1907, a Dines pressure-tube anemometer was added to the establishment. At first, it too was erected on the top of the building, but later a more open site was obtained in the vicinity of the College.

For many years the work at the observatory was carried out entirely by one observer. The first was Mr. William Boswell, who held the appointment from 1868 until the end of 1902, with Professor David Thomson officially as Superintendent until 1880, and then under Professor Charles Niven who succeeded Professor Thomson in the Chair of Natural Philosophy. In January 1903 Mr. George Aubourne Clarke\(^3\), who had received training under the Meteorological Office was appointed observer and remained in charge until 1943 when he retired. During his time in office he spent much of his spare time in the observation and

\(^2\) AEM Geddes *The Development of the Study and Practice of Meteorology at Aberdeen* in *Weather* vol X, No. 11, pp 285 - 289

\(^3\) For more on Aubourne Clarke see my piece at [https://homepages.abdn.ac.uk/npmuseum/Scitour/CTGAC.pdf](https://homepages.abdn.ac.uk/npmuseum/Scitour/CTGAC.pdf)
photographic registration of clouds and related phenomena. His success in cloud photography was such that in very many of the meteorological publications of the first half of the twentieth century from 1920 onwards Clarke's cloud photographs occupy a prominent place. At his death his cloud collection was acquired by the Royal Meteorological Society, London.

The Natural Philosophy assistant AEM Geddes cut his teeth as a meteorologist with a program that investigated the winds in the upper atmosphere by launching pilot balloons from the Cromwell Tower or nearby. These were usually tracked by a pair of observers using theodolites to measure a balloon’s altitude and azimuth from which its velocity components could be deduced, and hence the speed and direction of upper atmosphere winds. He made extensive trials from 1912 through to 1914. This was quite an early effort to provide a regular link between science and observation in the third dimension, above the Earth’s surface. Geddes was seconded to the Meteorological Office in 1915 and thence to the Royal Flying Corps to act as meteorologist in France and Belgium, not the safest of postings. At the end of the war more than one individual who made his early acquaintance with meteorology at King’s College elected to stay on in the service of the Meteorological Office. Geddes himself became a lecturer in Natural Philosophy at Aberdeen with a career that lasted until 1955.

At the end of 1921, the observatory was taken over by the Air Ministry and the staff increased. It served as a training ground for beginners in the service and continued up until 1947 when it was closed and essentially mothballed until some time in the 1980s. Michael Gadsden re-purposed it as an observatory for noctilucent clouds, too high in the atmosphere to affect the weather directly but an indicator of atmospheric changes in the mesosphere.

When the degree of BSc (Forestry) was introduced, a course in meteorology was added to the requirements in 1922, though no lecturer was appointed. This was made good with the appointment of Owen F T Roberts in 1924 under the Cruickshank Bequest, mainly for conducting research in meteorology. He also took over the lecturing until he was seconded in WWII to the Met Office when Geddes took over his duties. This course continued in the Foresters’ syllabus until about 1970. Geddes mentioned that after the war, meteorology also formed courses on offer to second year Physics students and to Honours Physics students. These fell out of fashion but in the early 1990s, Michael Gadsden (a long-standing Fellow of the Royal Meteorological Society) began a course in Astronomy and Meteorology for first year students that immediately became very popular. After his retirement in 1997 John S. Reid (likewise a Fellow) gave a revised course from 1998 to 2008, a year after his retirement, and as I pen this in 2020 the course is still the most popular Physics course in the University Calendar.