OCCASIONAL PAPERS ON METEOROLOGICAL HISTORY No.17

THE FIELD COURSES OF THE ROYAL METEOROLOGICAL SOCIETY

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Published by
The Royal Meteorological Society's
History of Meteorology and Physical Oceanography Special Interest Group

NOVEMBER 2015

ISBN: 978-0-948090-41-7

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Royal Meteorological Society
November 2015

View across Malham Tarn at about 8pm on 28 July 1959, showing a large cumulus which shortly afterwards showed a marked anvil formation.
Photograph by Nancy J Gordon published in *Weather*, February 1961, **16**, 2, p.45.

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SUMMARY

This paper reviews the field courses run by the Royal Meteorological Society over more than four decades. Many distinguished meteorologists have served as instructors or visiting lecturers, and a variety of courses have been offered, many on meteorology *per se*, others on leisure activities such as hill walking, gliding, sailing or ornithology. Published reports show that courses have been, for the most part, challenging and enjoyable and have contributed greatly to the sum of school and popular meteorological education since the Second World War. A noticeable feature of the courses has been the cooperation of local meteorological offices and various university departments and the generosity of instrument manufacturers who have loaned or donated equipment.

The paper is in three parts, covering:

1 The formative years (to the early 1960s).
2 The years when full programmes of courses were provided by the Royal Meteorological Society on a regular basis, with some courses running annually for many years (from the early 1960s to the middle of the 1980s).
3 The final years when courses were offered and the reasons why the Society ceased to run field courses (from the middle of the 1980s to 1995).

Part 1 makes considerable use of reports on courses published in *Weather*, while Part 2 is concerned largely with administration and resources. Much of Part 3 is based on minutes of Society Council and committee meetings and such supporting committee papers as have survived.

In post-war years, there was greater formality than today. Thus, it was usual to give titles and initials of instructors, lecturers and others, rather than given names. In this paper, the trend towards greater informality is acknowledged by the increasing use of given names from about 1960 onwards.

PART 1
The formative years

POST-WAR ANTECEDENTS

Such was the importance of meteorology during the Second World War that staff numbers in the Meteorological Office increased from 763 at the end of March 1939 to 6760 by the end of August 1945. At the same time, there was a substantial increase in membership of the Royal Meteorological Society, from 810 at the end of 1938 to 983 in 1943, 1178 in 1944 and 1443 by the end of December 1945. The new members came from many walks of life and many parts of the world, not a few of them men and women who had served during the war in the Meteorological Branch of the Royal Air Force Volunteer Reserve. They had become sufficiently interested in meteorology to feel moved to join the United Kingdom's national meteorological society.

In the latter stages of the war, several members of the Royal Meteorological Society's Council began to give thought to ways and means of encouraging and retaining the new members and enhancing their interest in meteorology. In the words of the Society's annual report for the year 1945: "The Development Committee appointed by the Council in 1944 to advise on ways and means of furthering the usefulness and general appeal of the Society held two meetings during 1945" (*Q.J.R.Met.S.*, 1946, **72**, 311, p.120). The annual report for 1946 shows that action had soon been taken (*Q.J.R.Met.S.*, 1947, **73**, 315-316, p.198):

> The first complete year of the Society's post-war activity has been in several respects one of outstanding accomplishment. It has witnessed not only the launching of a very successful monthly magazine [*Weather*], but also the formation of a Scottish Centre, and the innovation of a meeting in Wales.

The minutes of the Society's Council for 16 January 1946 show that Mr A J Drummond, the Society's Scottish Secretary, was the main driving force behind the launch of *Weather*, the minutes recording that "he felt that the Society was not doing enough for its Fellows". Little time was lost. Council agreed on 8 March 1946 that the new magazine should be published, and the first issue appeared only two months later.

Council's report for the year 1947 shows there was no shortage of articles for publication in *Weather*; and it also showed that a Midland Centre of the Society had been established (*Q.J.R.Met.S.*, 1948, **74**, 320, pp.205, 206). It was further noted in the report that the centenary of the Society's foundation would fall in April 1950, when:

> To mark the occasion, the Council were arranging for the production of an up-to-date re-issue of *Some problems of modern meteorology*, as well as a new edition of *Weather Lore*, by the late Richard Inwards, who by his will left the copyright in this unique work to the Society.

As yet, there was no mention of field courses.

Council's commitment to both professional and amateur membership of the Society was made clear in the report for the year 1948 (*Q.J.R.Met.S.*, 1949, **75**, 324, p.199):

> Evidence of a further increase in the Society's activities as the tenth decade in its history draws to a close may be found in the larger number of meetings held by the Society and its Scottish and Midland Centres. As the result of a recommendation by the Development Committee, the Council agreed that some leading meteorologists be invited to give a series of popular lectures of particular appeal to amateur members of the Society. A programme of seven such lectures has now been arranged, and two of them have already been delivered.

> There has also been an increase in the number of papers submitted for publication in the *Quarterly Journal*; this year's figure of 44 compares well with that of 40 for 1947, which in itself was shown to be much above the pre-war average. In addition to this, there has been a satisfactory inflow of material for *Weather*, and a considerable increase in the number of advertisers.

In 1949, Council was preoccupied with planning the Society's centenary celebrations and, in the words of the Society's annual report, "an attractive and comprehensive programme has been drawn up" (*Q.J.R.Met.S.*, 1950, **76**, 328, p.224). "The Council are confident that the commemoration of the anniversary has been so arranged as to have appeal to every Member, professional and amateur". In addition to the ordinary scientific meetings of the Society, at which papers for publication in the *Quarterly Journal* were read, five popular lectures had been delivered, all in the Lecture Theatre of the Science Museum; and several meetings of the Scottish and Midland Centres had been held.

The annual report for 1950 summarized the Centenary activities of the Society and noted that a full account of the activities had been given in the *Centenary Proceedings of the Royal Meteorological Society*, a volume of nearly 300 pages (*Q.J.R.Met.S.*, 1951, **77**, 333, p.495). It also noted that a completely revised and enlarged edition of Inwards's *Weather Lore* had indeed been published on behalf of the Society, as well as a set of 24 postcards illustrating cloud-types from the Clarke Collection.[1]

THE PIONEER FIELD COURSE

Annual reports are, of course, published sometime after the event. The first reference to a field course in an annual report of the Royal Meteorological Society came on page 496 of the report for 1950 (*op.cit.*):

> It is appropriate that the centenary year of the Society should have also marked the inception of vacation courses in elementary synoptic and observational meteorology. The pioneer course was held in September at the Malham Tarn Centre of the Council for the Promotion of Field Studies [near Settle, Yorkshire], and was an outstanding success both as regards attendance and the calibre of the students. Further and extended courses are being arranged in 1951.

It was further noted on page 496 that ten of those who had attended the 1950 course at Malham Tarn had joined the Society as Student Members.

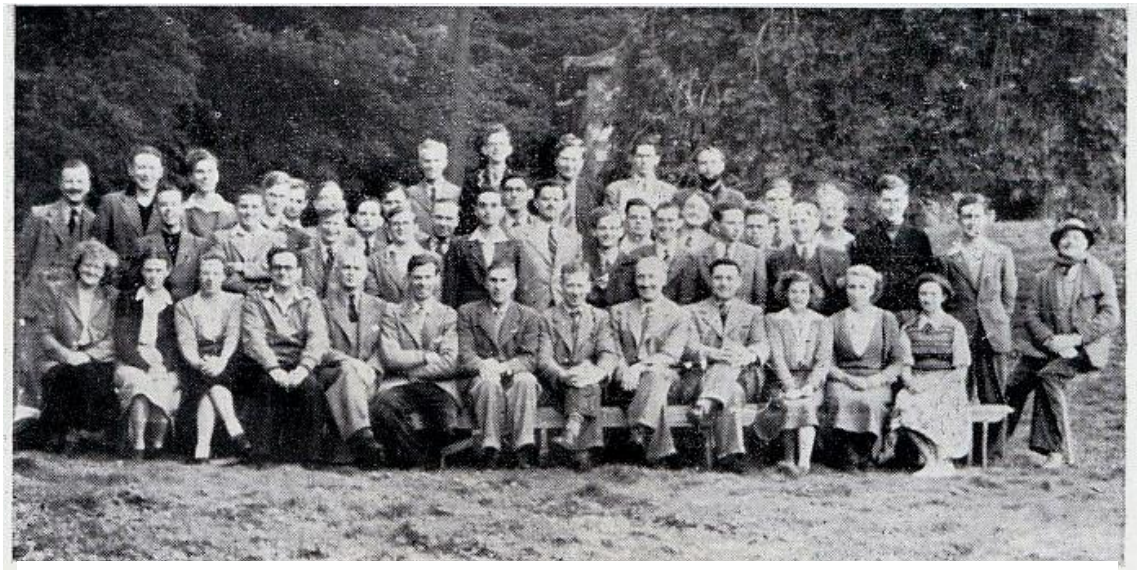
Most members of the Society came to know of the planned field course when it was advertised in the June 1950 issue of *Weather* (Butler, 1950). The course would be run by the Council for the Promotion of Field Studies, with the cooperation of the Royal Meteorological Society, and it would be a course in observational and synoptic meteorology directed by James Paton, who was a lecturer in meteorology in the University of Edinburgh and then the current Scottish Secretary of the Royal Meteorological Society. Assisting him would be C D Ovey of the British Museum (Natural History), who had been a weather forecaster with the Royal Air Force during the war, and Norman Pye, lecturer in geography in the University of Manchester. The course would be suitable for university students, teachers, sixth formers and amateur observers. An elementary knowledge of physics would be assumed. The Meteorological Office had agreed to loan instruments and provide weather reports. The inclusive cost of the course would be five guineas.

[1] Mr George Aubourne Clarke died on 13 February 1949. He had been a member of the observatory staff at Aberdeen's King's College from 1903 to 1943. As it was put in the Society's annual report for 1949 (p.225), "he had a world-wide reputation as a cloud photographer". His entire collection of 600 cloud negatives, together with a large number of prints, was acquired by the Society's Council, by arrangement with Mrs Clarke. As it was also put in the annual report for 1949, "enlargements from some of the best of these are being framed for display in the Society's rooms and the Science Museum at the time of the centenary" (annual report, p.224).

A full report on the course appeared in the November 1950 issue of *Weather*, its opening words being that "to study any natural science – and the weather is certainly one of these – no place is better than the field" (Ovey, 1950). The number of students who had attended was 43, and Ovey reported that several of them intended to take up a meteorological career. According to him, the students had "lived together for a week in an atmosphere of true democracy – happy, cheerful and intensely enthusiastic – to make the weather a living interest to them".

Physical aspects of meteorology had been taught by James Paton and instruction on instrumental work given by Norman Pye. The application of physics to the actual phenomena of the present weather and the construction of weather charts had been covered by Mr Ovey. "Towards the end of the course", Ovey said, "the students were plotting charts of their own, and some were so rapid in learning to interpret the codes that they were able to complete a chart in an afternoon, while a few even attempted forecasting".

The weather had cooperated. There had been two cold fronts, two occlusions, a warm front, and a thunderstorm. There had been a morning with "a sea of valley fog bathed in sunshine, which slowly rose, spilled over the lower moranic hills and limestone terraces towards the tarn and dispersed, giving place to cumulus". As Ovey wrote: "What more perfect a setting could be afforded to watch the processes of radiation and convection at work than this tranquil highland-scene to the accompaniment of the curlew!". An opportunity for Mr Paton to discuss optical phenomena had been presented by the formation of a solar halo on an occasion of cirrostratus. There were talks and discussions in the evenings, with a Brains Trust one evening.



The pioneer field course: staff, students and a visiting lecturer, Gordon Manley (front row, fifth from the right). From Ovey (1950), opposite p.390. Photograph by R E Lacy.

It is not known who inspired the post-war initiatives to encourage amateur members of the Royal Meteorological Society. Mr A J Drummond has already been mentioned as a driving force behind the magazine *Weather*, but it has been widely acknowledged that the Father of the Royal Meteorological Society's school and popular meteorological activities, and the person who enthused others to play leading rôles in the Society's education expansion in the 1940s and 1950s, was really Mr (later Professor) Gordon Manley, who was President of the Society for the years 1945 and 1946 (Ratcliffe, 1993). He was a geographer – and a modest man – with a keen interest in field work, who had studied the weather of the northern Pennines for many years and made meteorological observations on the summit of Dun Fell from 1937 to 1939, two miles SSE of Crossfell, when

investigating the 'helm wind' of Cumberland and Westmorland (Manley, 1942, 1945).[2] In this work, he had been assisted by members of the public and understood the valuable contributions to research such people could make. His interest in the pioneer field course at Malham was shown by a visit from him on the last day of the course, when, as Ovey put it, "he discussed many things, from post-glacial climatic changes to the exhilarating life on Crossfell in the winter when five feet of rime encrust one's meagre dwelling place".

TWO COURSES IN 1951

The January 1951 issue of *Weather* carried an advertisement for two field courses that year, one at Malham Tarn Field Centre, the other at Dorking Field Centre, Juniper Hall, Surrey, both organized jointly with the Council for the Promotion of Field Studies (*Weather*, **6**, 1, p.15). The course at Malham would last a fortnight (5-19 September) and be intended mainly for university students, while the course at Juniper Hall, from 5-12 September, was "intended to be of a more introductory nature, particularly suitable for students of geography". The advertisement further advised that:

> The first week [of the course at Malham] will be devoted to introductory lectures and instruction in the elementary physical basis of meteorology and in the use of instruments. Discussions will again be held on allied subjects and special questions concerning meteorology. The second week will be devoted to practical work, plotting and forecasting. Those who attended the Pioneer Course last September might be interested to participate in the second week this year.

The courses were advertised again in the April 1951 issue of *Weather* (**6**, 4, p.120), including the information that the inclusive cost of each course would be £6 10s. 0d. per week.

In both the January and April advertisements, it was stated that the Executive Committee of the Council for the Promotion of Field Studies and the Council of the Royal Meteorological Society had formed a Joint Committee to arrange regular annual courses in meteorology.

The staff of the courses at Juniper Hall and Malham were named in the July 1951 issue of *Weather* (**6**, 7, p.218).

Those at Juniper Hall would be:

> Mr R P Pearce, who was carrying out research in meteorology at the Imperial College of Science and Technology, London.
> Mr R E Lacy, of the staff of the Building Research Station, Garston, Watford, who was working on weather problems concerning buildings.
> Mr D J Schove, who had been a forecaster with the RAF during the war and was now headmaster of a preparatory school and researching into historical climatic problems.

Those at Malham would be:

> *From 5-12 September*:
> Dr A W Brewer, who was working on meteorological problems with Professor G M B Dobson at the Clarendon Laboratory, Oxford, and had been a forecaster during the war.
> *From 12-19 September*:
> Mr C D Ovey, who had also been a forecaster during the war and was now working at the Natural History Museum, London.
> *From 5-19 September*:
> Mr N Pye, lecturer in geography at the University of Manchester.

[2] The title of the Presidential Address delivered by Manley before the Royal Meteorological Society on 17 January 1947 was 'The geographer's contribution to meteorology'. The opening words of his address were that "meteorology is a branch of physics", and he went on to argue that progress in meteorology should come from increased cooperation between geographers and physicists.

There would also be demonstrators; and, in addition, James Paton and Gordon Manley hoped to visit Malham during the course.

A footnote in the information published in the July issue of *Weather* advised that a reduction from £6 10s. 0d. to £5 0s. 0d. per week was possible for students of London and Cambridge Universities who indicated the fact on their application forms.

Reports on the two courses were published in the October 1951 issue of *Weather* (**6**, 10, pp.297-299).

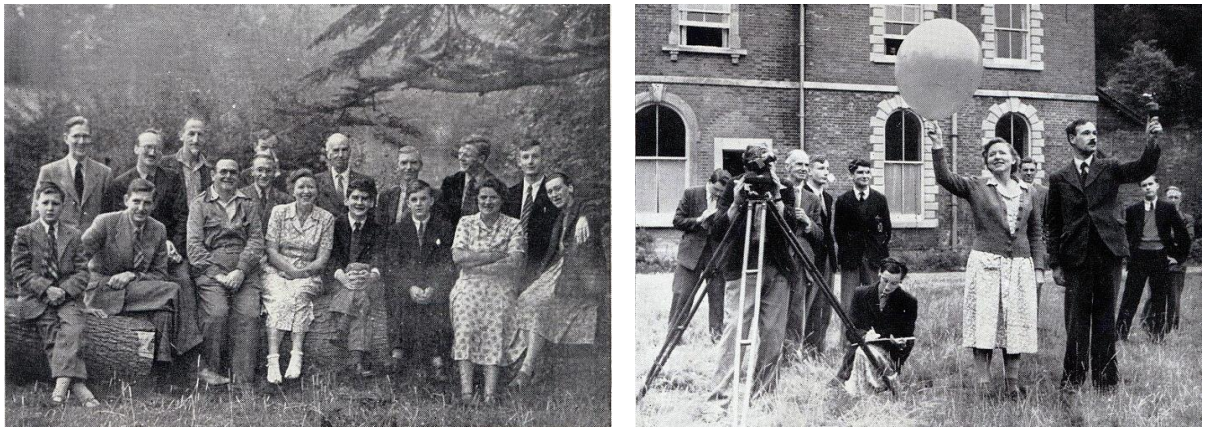
The course at Juniper Hall

The author of the report on the course at Juniper Hall was R E Lacy (*op.cit.*, pp.297-298). He began with the comment that "if any students or staff expected a quiet and restful week in the pleasant park-like surroundings, they were speedily disillusioned". Those who had arrived early on the opening day had immediately been "enrolled into a labour force and presented with the task of unpacking and transporting three large Stevenson screens to Juniper Bottom, a nearby dry valley". Thereafter, Lacy said, the pace had not slackened. From breakfast-time, or even before, each day had been filled with lectures and observations, plus discussions which continued until late at night. "There was even", he reported, " a late night excursion to Juniper Bottom with smoke-candles, in the hope of making visible katabatic air-flow down the slopes".

The programme of lectures had been similar to that of the pioneer course in 1950. Basic physical concepts and their interpretation on synoptic charts had been covered by Mr Pearce. Climatology, both past and present, had been covered by Mr Schove, and instrumental and observational aspects had been covered by Mr Lacy himself. During two afternoons, a number of pilot-balloon ascents had been made, with the balloons followed by theodolites at three stations about half a mile apart.

After supper each evening, there had been a lecture or discussion, one of them given by Mr F H Ludlam of the Imperial College of Science and Technology, who had spoken about clouds, "explaining the various forms and the reason for their appearance, illustrating his talk with a magnificent series of slides". Gordon Manley had visited on the Monday and spoken "with an infectious enthusiasm of his researches into the weather diaries kept during the 17th and 18th centuries by many amateur meteorologists".

When thanking the many people who had made the course so successful, Lacy acknowledged the staff of the Meteorological Office at Biggin Hill, who had provided synoptic observations each day by telephone.



Staff, students and activities at Juniper Hall, 1951. From Lacy (1951), opposite p.296. Notice how one dressed for a field course in 1951! Photograph on the left by J H P Sankey. Photograph on the right by Art Photos, Hackbridge, Surrey.

The course at Malham Tarn

In his account of the course at Malham Tarn (*op.cit.*, pp.298-299), Mr Pye noted that the syllabus for the first week had been much the same as that for the course in 1950, "devoted mainly to the physical basis of meteorology with suitable practical work, which included installing a meteorological station, making routine meteorological observations, and plotting synoptic data". A station had been established on the summit of Highfold Scar and "re-equipping the station erected at the Tarn side in 1950 afforded opportunity for study of temperature and humidity variation between stations closely adjacent but differing considerably in altitude and site characteristics". A visit had been made at the end of the week to the Preston Forecasting Office.

A hand anemometer in use at Malham, September 1951. From Pye (1951), opposite p.297. Name of photographer not known.

High pressure had dominated during the first week, but, in contrast, families of depressions had brought unsettled weather in the second week.

During the second week, two sets of synoptic and upper-air data had been received each day by telephone from the Squires Gate weather station near Blackpool and used in the interpretation of frontal passages and study of air masses. One afternoon, there had been a 'meteorological walk', during which changes in the sky and cloud formations had been discussed in continuous detail with reference to the synoptic situation and to the upper-air information which had previously been plotted.

Once again, Gordon Manley had visited, this time providing lectures on 'Snow in Britain' and the 'Elucidation of Post-Glacial Climatic Changes'.

In summary, Pye said that:

> One of the pleasurable features of the meteorological courses run at Malham is that individuals without exception prove to be likeable and friendly and immediately settle down into a real society. That something of this community spirit survives the course is demonstrated by the number of letters received from students who attended the 1950 course wishing the 1951 party well.

Pye mentioned, too, that news of the meteorological activities at Malham in September 1951 had been broadcast by the BBC in *News from the North* during the second week of the course, and a recording of impressions of the course had been made by four of the youngest students, to be broadcast in a *Children's Hour* News Reel on 11 October.

Juniper Hall post-script

By way of a post-script to the 1951 courses, a Letter to the Editor was published in the November 1951 issue of *Weather* (**6**, 11, pp.349-350). In it, Richard and Mary Wilson thanked all who had organized and run the course at Juniper Hall and admitted that they still didn't understand "the British weather which could behave with such irritating sameness for a week" while they were "solely intent on its study" and blow with such swift changes immediately they had returned home!

COURSES IN 1952, 1953 AND 1954

The March 1952 issue of *Weather* (**7**, 3, pp.89-90) carried an advertisement for another course at Malham Tarn, this one from 3 to 10 September 1952 and once again a joint venture between the Royal Meteorological Society and the Council for the Promotion of Field Studies. The instructors would be Mr James Paton and Mr C D Ovey, assisted, as in 1951, by the Society's *Weather* Clerk, Miss Valerie C Jones, who would serve as demonstrator. There was no mention of a course at Juniper Hall, and there was, indeed, in the event, only one course in 1952, at Malham.

The course at Malham Tarn in 1952

It was clear from the advertisement that students on previous courses had come from far and wide:

> It is hoped that there will again be the good representation from overseas which has been such a welcome feature in previous courses and added so much to the interchange of ideas and experiences. Overseas *Weather* correspondents are asked to make this as widely known as possible among meteorological friends.

An account of the course appeared in *Weather* in November 1952 (**7**, 11, pp.347-348). Written by C D Ovey, it was called 'Weather course in the wilds'.

The account began by saying it was "no exaggeration" that the course had "proved an unequalled success". However, Ovey noted that previous courses had not been without criticism, in particular in respect of "making the practical application of the physics of the atmosphere so much easier to demonstrate in the interpretation of daily information for weather forecasting". Criticisms by students concerning the order in which the syllabus had been taught in previous years were also addressed by instituting 'daily weather' talks "from the start and practical work put in motion on the first day".

It was clear from Ovey's report that the field courses were demanding, the one in 1952 embracing:

> Energy changes in the earth's atmosphere, water vapour in the air, atmospheric pressure and the dynamics of air-movement, stability and instability, adiabatic diagrams and the T-Ø gram, theories of precipitation and cloud formation and cloud-forms, synoptic meteorology, the recognition of fronts and the theory of frontal systems and depressions, forecasting and a constant eye on the sky outside. Plotting was done by the students, and the speed with which the codes were learned and applied was equalled only by the enthusiasm with which it was carried out and the uncanny silence of many concentrating minds. Observations were made and comparative sets of readings near the tarn below the house, in the official screen, and at the top of the scar, 250 feet above, were recorded on a blackboard for comparison – a scheme instituted the previous year by Mr Pye. Physical effects such as radiation, wind, cloudiness and differential altitude could thus be clearly seen to work in practice.

Students do not appear to have had any spare time to write postcards to send home!

Once again, meteorological information was obtained by telephone each day from Squire's Gate, in the form of surface observations to plot 06:00 and 12:00 charts, along with a small amount of upper-air information. In Ovey's words: "This information, although costly, was indeed the backbone of the course, for, without it, it would have been impossible to demonstrate present events and to show fully the practical use of the physics which Mr Paton taught, or to explain the forecasts attempted by the present writer".

Visitors to the course included Dr Marjorie Sweeting, lecturer in geography at the University of Oxford, and, once again, Professor Gordon Manley. She gave a talk about the physiography of the Malham area and led an excursion to Malham Cove. Professor Manley explained how *Monthly Weather Reports* could be used and "gave an exhaustive account of his field work on the

phenomenon of the helm wind of Cross Fell and the North Pennine escarpment". Together with another visitor, Mr M E Schoenberg, Assistant Secretary of the Royal Meteorological Society, the Warden of the Malham Field Centre, Mr P F Holmes, conducted a Brains Trust.[3]

The course attracted 26 students, one of them a Meteorological Office assistant who had come "to learn something of the theory and its application to his routine employment of plotting charts". Three students were geography teachers and several were university physics and geography students. Another student had been employed by the Meteorological Office and come to refresh his memory; and yet another was the general manager of an aircraft component firm who owned a private aircraft! Twelve of the students were subsequently elected to membership of the Royal Meteorological Society (*Q.J.R.Met.S.*, 1953, **79**, 341, p.445). Eight were elected as Fellows, four as Student Members.

The Malham course, 1952: staff, students and visiting lecturers, including Marjorie Sweeting (seated third from the left) and Gordon Manley (seated fourth from the left). James Paton is seated fourth from the right and C D Ovey third from the right. Mr P F Holmes is seated second from the right, Mr M E Schoenberg second from the left, and Miss Valerie Jones next to him, holding a dog. From Ovey (1952), opposite p.348. Photograph by A Horner & Sons.

The course at Malham Tarn in 1953

A report on the fourth course at Malham Tarn, by L H Riddell (one of the students), appeared in the November 1953 issue of *Weather* (**8**, 11, pp.331-332). In this, he provided information about the field centre itself. It had, he said:

> Started life as a shooting lodge and latterly become the property of the National Trust who leased it to the Council for the Promotion of Field Studies. It has been fitted with well-equipped laboratories for the study of natural history; there is also a lecture-cum-common room holding about 40 students, and a dining room with one of the finest views in Yorkshire. There is plenty of hot water, and the students' share of the domestic chores is limited to making their own beds

[3] In 1952, the title of the Royal Meteorological Society's chief administrative officer was 'Assistant Secretary'. Over the years, the title has changed to 'Secretary', 'Executive Secretary' and, latterly, 'Chief Executive'.

> and to one day's washing up. The only connection with the outside world was the telephone, the once-a-day post van, and such contact as was made by those whose daily exercise took them to Malham village and Settle. There was no radio (except for strictly official purposes) and scarcely any newspapers.

The course followed much the same pattern as in previous years, beginning at 07:55 each day, when Mr Ovey listened to the weather forecast on the one and only domestic radio receiver and then drew a chart of the British Isles which showed the pressure distribution and the position of fronts, if any. The syllabus for the course was similar to that of previous years, and surface observations were again obtained from Squire's Gate.

James Paton, the course director, covered "the elementary facts of physics without which no one can start to understand weather forecasting" and, said Riddell, had "a gift for making the difficult appear simple", adding that "his task was complicated by the fact that the audience consisted on the one hand of post-graduate physics honours men and, on the other, of business men who might have heard about Fahrenheit in their school-days". There were again 26 students on the course.

As in previous years, there were lectures each evening by visiting experts, among them Norman Pye, who had been an instructor on previous courses, but there was no mention of Gordon Manley this year. On the second evening, the speaker was Mr F E Lumb, Senior Meteorological Officer at the Air Traffic Control at Preston, "who let us see the mechanics of a forecasting office and the immense amount of detailed work necessary before a forecast can be prepared". There had again been a Brains Trust.

Support for the course from outside bodies was shown by Riddell's recognition of firms which had provided many of the instruments used on the course: Messrs C F Casella and Co Ltd.; Darton and Co Ltd; Heath, Hicks and Perken (Thermometers) Ltd; Short and Mason Ltd; and G H Zeal Ltd.

Fourteen of the students were subsequently elected to membership of the Royal Meteorological Society (*Q.J.R.Met.S.*, 1954, **80**, 345, p.468).

In the field at Malham Tarn, September 1953. From Riddell (1953), opposite p.331. Photograph by A Horner & Sons.

The course at Malham Tarn in 1954

The course at Malham from 25 August to 1 September 1954 was fully subscribed. In the words of Dr S R Eyre, lecturer in geography in the University of Leeds and an instructor on the course (*Weather*, 1954, **9**, 10, pp.314-316):

> The growing popularity of meteorology as a subject for vacation study was emphasized again this year by the large number of applications for this course, many of which had to be rejected

> after the full complement of about 40 students had been accepted. Students of mathematics, physics, geography, and biology from many universities were present, as well as several members of the teaching and engineering professions.

Seventeen of the students were subsequently elected to membership of the Royal Meteorological Society (*Q.J.R.Met.S.*, 1955, **81**, 349, p.515).

Eyre reported that James Paton and Mr C D Ovey had again been the course directors, the latter now a lecturer in geography in the University of Cambridge. Paton had covered the physics of the atmosphere and Ovey the practice of synoptic meteorology. In addition, Mr E J W Spence had given an evening lecture on meteorological instruments, which had been " a great help to the course in assisting the majority of the students in handling a great variety of meteorological equipment". Current synoptic reports had again been received by telephone from Squire's Gate and used by the students for plotting charts, under the direction of Mr C R Finch. Mr Ovey's lectures had been supplemented by a visit to the Preston Meteorological Office, where the teleprinter had been seen in action "and contact made with the daily routine of weather forecasting".

Once again, Professor Manley had visited, giving an evening lecture on the Helm Wind, which had led to a general discussion of the existence of standing waves in the atmosphere. Other evening lectures had been given by Dr W A Fairbairn, lecturer in forestry in the University of Edinburgh, who had spoken about the climatic elements which were usually regarded as being significant by the forester, and Mr W V Lewis, lecturer in geography in the University of Cambridge, who had spoken about the movements of glaciers and the process of glacial erosion.

Eyre commented that "a week's course covering the whole field of meteorology must inevitably seem far too short both to lecturers and students". Nevertheless, he said, " such a course must be of inestimable value to all who take part in it; as a basis for future research work, its value cannot be rated too highly".

TWO COURSES IN 1955

In 1955, there were two courses: one at Malham, mainly for undergraduates, the other at Juniper Hall Field Centre, for sixth-form pupils. According to the Royal Meteorological Society's annual reports, the courses were very successful, and fifteen students were elected to membership of the Society (*Q.J.R.Met.S.*, 1956, **82**, 353, p.362).

The course at Malham Tarn

The course at Malham from 24 to 31 August was written up for the October 1955 issue of *Weather* by a Dutch student, H A D Mispelblom-Beyer, who had travelled by train from London to Settle and very much enjoyed the experience (*Weather*, **10**, 10, pp.348-350). The nearer he got to Settle, he said, the more he felt like a small boy going to school for the first time! This feeling had been accentuated when shown the small cubicle which was to be his "private sanctuary" for the next week. He had been concerned that there might be some noise at night, but this had not happened. He was "under the impression that people did not dare to turn in their beds for fear of keeping their neighbours awake".

On the evening of his arrival, Mr Mispelblom-Beyer said, he was "convinced that Father Christmas had made a mistake and arrived many months before he was due"! There was a collection of meteorological instruments "which would have satisfied the most exacting weather enthusiast", assembled by Mr E J W Spence of Short and Mason Ltd and generously provided by several firms. He was particularly keen to mention three of the instruments, naming first the Assmann psychrometer, for the simple reason, he admitted, that he had "always wanted to possess one instead of the whirling variety", the use of which, he went on, was "a daily recurring cause of annoyance" to him. The other two instruments he mentioned were the sunshine recorder and the recording rain-gauge,

"as their readings gave a clear indication of the weather situation". The recorder had "worked at full blast" the whole week, but the gauge had read zero until the last day "when some water and a crayfish from the Tarn mysteriously found their way into the funnel"! Messrs Ovey and Finch had provided instruction in plotting and analysing weather charts, "the latter spending much of his time at the radio to pick up the necessary data".

Mr Mispelblom-Beyer was much impressed with the lectures, saying there was neither too much theory nor too little. As an example, he reported that another of the instructors, Dr R S Scorer, of Imperial College, had said little about the thermodynamical theory behind the T-Ø gram but had given a "clear exposition" on the data it could supply. "With great pleasure" had he listened to Dr Scorer's talks on condensation and glaciation, thermals, thermal winds, showers, thunderstorms and fog. One afternoon, Scorer "took out a party of students for instruction in the use of theodolites". Pilot balloons had been released and wind measurements made, an exercise in which "the van of the Meteorological Department of Imperial College with its radio equipment and other facilities had stood in good stead".

As in previous years, there was a full programme of evening lectures, speakers including Professor P R Crowe of Manchester University, Dr D Walker of Cambridge University and Professor Gordon Manley of Bedford College, London. Mr Mispelblom-Beyer said he counted himself lucky to have been among their audience.

There were 35 students on the course, ten of them female.

The course at Juniper Hall

A short report on the course for sixth-formers that was held in the first week of September 1955 at Juniper Hall appeared in *Weather* in November 1955 (**10**, 11, p.394). Written by the two instructors, Mr W D S McCaffery and Mr C E Wallington, it showed that the students had responded well to the scientific challenges put before them. In the words of McCaffery and Wallington:

> Some of the 17 boys and 15 girls attending the course had a flair for the descriptive side of synoptic meteorology rather than mathematics, but their general scientific ability and sheer enthusiasm steered them through most of the necessarily intensive course. In fact, the practical work was extended beyond the planned syllabus, for, working as four teams, these sixth-formers managed to plot some of the current synoptic charts and study the relevant tephigrams sufficiently well to try their skill at local forecasting.

Field work included observational and pilot balloon work, which was carried out in fine weather on most days. There were, however, some variations in the weather, which, McCaffery and Wallington said, proved to be instructive "from both the observational and forecasting points of view".

Lectures were given by visiting speakers after each evening meal, illustrating, as McCaffery and Wallington put it, "the broad scope of meteorological research". Mr R E Lacy discussed the meteorological problems which beset the building industry; and Mr H Charnock of the National Institute of Oceanography spoke about inter-relationships between oceanography and meteorology. Mr D H Lucas of the Central Electricity Authority research laboratories described work on smoke pollution; and the subject of a lecture by Dr R M Goody of Imperial College was the upper stratosphere. A talk was also given by a visitor to the United Kingdom, Mr R A McCormick, who was in the country on an exchange basis between the United States Weather Bureau and the Meteorological Office, his topic being 'Some aspects of the work of the Bureau'.

During the week, there was an excursion to the Meteorological Office radiosonde station at Crawley, where the students watched an upper-air ascent being made; and at the end of the course a few of the students were able to visit the research laboratories of the Central Electricity Authority at Leatherhead, where, in the words of McCaffery and Wallington, "intensive work on atmospheric

pollution served as an interesting example of the wide field of meteorological research already described during the course".

COURSES IN 1956

Once again, there was a course at Malham Tarn, mainly for undergraduates; and there was also a course for sixth-form pupils, but this year at Flatford Mill Field Centre, Suffolk, not Juniper Hall. Both courses were held in conjunction with the Field Studies Council.[4] The annual report of the Royal Meteorological Society for 1956 stated that that the courses had been "very successful" and that sixteen students had subsequently been elected to membership of the Society (*Q.J.R.Met.S.*, 1957, **83**, 357, p.397).

The course at Flatford Mill

A short account of the course at Flatford Mill appeared in *Weather* in October 1956 (*Weather*, **11**, 10, p.332). Written by Dr G B Tucker, one of the instructors, it did not give the dates of the course or the number of students but did show that the students had been introduced to both theoretical and practical meteorology and "seemed to have had a very enjoyable six days". Mornings had been taken up with short lectures and afternoons with practical work. In Tucker's words:

> Anemometers twirled, psychrometers whirled and balloons leapt into the sky: theodolites tracked while cartographers mapped – thank goodness the weather was dry!

Tucker went on to say that the instruments had been loaned by the Meteorological Office, Imperial College of Science and Technology, and Short and Mason Ltd. Perhaps the most interesting event of the week, he said, was the visit to Hemsby radiosonde station, where "several of the more eagle-eyed course members actually saw the radiosonde balloon burst at 63,000 feet".

There had been a number of visiting lecturers, including:
Dr C G Johnson of Rothamsted Experimental Station, who had spoken about 'Weather and the dispersal of insects'; Professor A A Miller of Reading University, who had spoken on 'Microclimatology and its importance to farmer and fruit-grower'; and Dr B J Mason of Imperial College, whose topic was 'Thunderstorms'.

The course at Malham Tarn

An account of the 1956 course at Malham Tarn by R Langridge, one of the students, was published in the November issue of *Weather* (**11**, 11, pp.365-366). The weather certainly appears to have been challenging. "Rain or shine, misty or clear", Langridge wrote, " gales or calms, thunder showers or gentle drizzle: all are of interest when the causes and effects are being studied". Such was the weather at Malham from 22 to 29 August 1956. For most people, such weather would have ruined their holidays, he said, but "four inches of rain in five days failed to dampen the enthusiasm of the 27 people attending the course".

The backgrounds of the students had been quite varied, about half from school or university and another five from the Royal Air Force (one of them from the WRAF). Of the other four female students, one had achieved a notable aviation feat. She was Miss Betsy Woodward, who had soared a sailplane to over 40,000 feet in the wave system formed by the Sierra Nevada in California.
Mr Mispelblom-Beyer had again been one of the students and had "by his witty remarks and questions", to quote Langridge, "contributed a great deal to our enjoyment during the week".

The instructors were Mr C D Ovey, Dr R S Scorer and Mr E J W Spence, and the daily programmes of instruction, practical work, and evening lectures were much the same as in previous years, with a visit and talk by Professor Manley one evening and the traditional Brains Trust on the Sunday

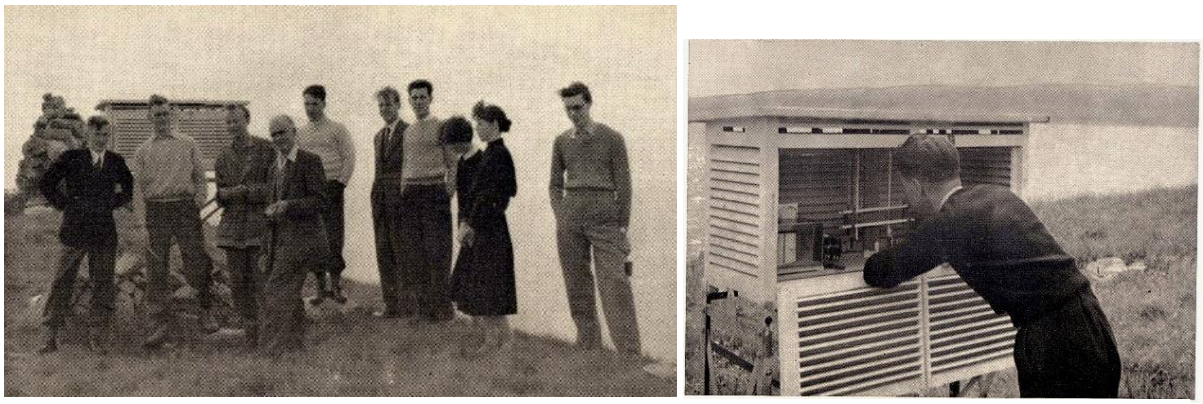
[4] The Council for the Promotion of Field Studies changed its name to Field Studies Council in the early 1950s.

evening. An evening talk by Dr Scorer, on 'Vorticity', was singled out by Langridge for special mention. He had, said Langridge, "again displayed his gift for presenting highly mathematical subjects in a very easy-to-understand way, yet without oversimplification". Scorer had also taken six students to the Yorkshire Gliding Club on the Sunday (which had been a day off for all students). A short quiz had been held on the last evening, followed by an impromptu sing-song before all retired for the night.

Another article about the 1956 course at Malham appeared in *Weather* in April 1957 (**12**, 4, pp.125-127), this one, by R E Booth, concerned mainly with student investigations of the week's inclement weather. The article listed the wet- and dry-bulb temperatures, grass minimum temperatures and relative humidity recorded at 07:00 GMT each day at each of two sites, as well as daily maximum and minimum temperatures at each. It also listed daily rainfall amounts, with readings taken at 07:00 GMT. The higher site, near the edge of the escarpment overlooking Malham House, recorded a total of 3.24 inches, whereas the site near the Tarn recorded 4.07 inches.

Three earth-thermometers were installed at a site near the Tarn, at depths of 1, 2 and 4 feet, respectively. In addition, temperatures two inches below the surface were recorded by soil-thermometers, with one on the escarpment, another in the open on the edge of the Tarn, one in a wood near the House, and the other within about ten yards of the edge of the wood. These soil temperatures were also recorded at 07:00 GMT each day and showed differences which were more or less what might be expected between such locations.

As Booth said, it was "not easy to draw any really firm conclusions from such scanty data". However, as he went on to say, these were "a few among many other types of investigations that students endeavoured to pursue, some of which, had time permitted, might have given more interesting results". And, as he pointed out, the ideas behind the experiments had come mainly from the students themselves. That was indeed a measure of the enthusiasm they had showed. In his words, "some students expressed the intention of coming another year"; and in previous years this had indeed happened. As the annual reports of the Royal Meteorological Society stated, the field courses were certainly successful.



Malham Tarn, August 1956. Left: Mr Ovey and students around the Stevenson screen at the site on the escarpment, with the surrounding country shrouded in mist. Right: Reading instruments in the screen at the edge of the Tarn. From Booth (1957), opposite p.121. Name of photographer not known.

A NEW COURSE IN 1957

Three courses were held in 1957, all in conjunction with the Field Studies Council (*Q.J.R.Met.S.*, 1958, **84**, 361, p.289). One was held at a new field centre at Preston Montford in Shropshire. Called Weather and Flight, it was intended mainly for members of Flying and Gliding Clubs and was supported by a grant from the Royal Meteorological Society's Scientific Activities Fund (*op.cit*., p.293). Another course, for sixth-form pupils, was held at Flatford Mill. The third course, which was mainly for undergraduates, was, as usual, at Malham Tarn. Fourteen students were subsequently elected to membership of the Society (*op.cit.*, p.289).

The course at Preston Montford

No report on the Weather and Flight course appeared in *Weather*. Advance information was, however, published in *Flight* magazine, on 15 March and 7 June 1957 (pages 328 and 786). The course would be held from 3 to 10 July and not only be organized by the Field Studies Council and the Royal Meteorological Society but also supported by the Royal Aeronautical Society. As it was put on page 328, the course would "explain the basic principles of cloud physics and air dynamics and interpret the natural phenomena of weather and the artificial phenomena of flight". The resident instructors would be Mr C E Wallington of the Meteorological Office, together with Dr R S Scorer and Mr F G Irving of Imperial College. The fee for the course would be about £8.

Additional information about the course was provided in the issue of *Flight* published on 15 June. Evening lectures would be given by Lorne Welch (on soaring), R J Murgatroyd (on meteorological research flying), J Barlee (on soaring birds), G L Stollery (on colour photography), and R C Rainey (on flight and migration of locusts). There would also be talk by a member of staff of the Manchester University Fluid Motion Department.

The course at Malham Tarn

A report on the course at Malham by R.Griffin, one of the students, appeared in the November 1957 issue of *Weather* (**12**, 11, pp.354-355). Twenty-five students had attended, "mainly from schools, colleges and the RAF", and the instructors had been C D Ovey, R S Scorer, E J W Spence, R E Booth and M E Schoenberg. The course had run from 21 to 28 August, with a programme of classroom and outdoor activities similar to that of previous years.

The week's weather had been dominated by a complex low-pressure system which had failed to dampen the spirits of the students. As Griffin remarked, barometric pressure at Malham's altitude of 1,300 feet is generally "impressively low", but on the Saturday night it dropped below 940 mb. The amount of rainfall recorded on the Saturday was 21 mm, and "a hand anemometer taken up on the limestone cliff behind the house went off the scale at 60 kt in gusts". At times on Sunday morning, the rain was "lashed almost horizontally across the landscape by the hurricane-force wind, which blew little waterfalls back up the hillside". Real weather indeed!

Griffin reported that Dr Scorer "announced that he proposed to make a short excursion before breakfast each morning, and invited those who wished to accompany him to meet him at 6.30am". Several students accepted his offer, and "were well rewarded for their early rising by seeing some of the finest local scenery showing the geological structure of the area". On the Sunday morning, a day off for the students, and breakfast an hour later than on other days, Scorer "planned an unusually long excursion, to climb Pen-y-Ghent". A small group of students duly assembled at 6.30 and drove to a point about a mile and a quarter from the summit and a thousand feet below it.[5] They reached the cloud base at about 500 feet from the summit, and when they arrived at the summit found

[5] The elevation of the summit of Pen-y-Ghent in 2,277 feet above sea level.

“seven other bedraggled individuals crouched behind a wall, eating a breakfast much diluted with rainwater”!

Another excursion led by Scorer on the Sunday involved a drive of 70 miles to the summit of Great Dun Fell, near Cross Fell, to the top of the highest motor road in England, where there was an Air Ministry station at an altitude of 2,780 feet. As Griffin put it, “visibility was again low, rain hard, and wind excessive; a Campbell-Stokes sunshine recorder which loomed up in front of us seemed quite out of place”.

As usual, there were evening lectures, including one by Mr T J Chandler, a lecturer at the University of London, who spoke on the climate of towns. Dr Scorer also gave an evening talk, on the Sunday, showing many colour slides of wave clouds, and the students must have been doubly satisfied (and no doubt impressed) because, the following day, “at every level all over the sky, there were wave clouds”, and “this state of affairs persisted for the rest of the course”.

The course at Flatford Mill

There was an engaging opening to the report on this course, which appeared in the January 1958 issue of *Weather* (**13**, 1, pp.30-31). In the words of J M Reason, a student on the course:

> To the casual passer-by, the scene was curious. Groups of figures wearing a gay assortment of clothes were dotted over the hillside; each group had weird instruments, some held by hand, others erected in the stubble. And if any of these passers-by were asked to guess the purpose of this assembly, it is unlikely that any two answers would be the same. It was, however, another meteorological course at Flatford Mill Field Centre [from 4 to 11 September 1957].

As Reason pointed out, a course for sixth-formers presented something of a challenge for the two instructors, Dr G B Tucker of Imperial College and Dr W T Roach of the Meteorological Office, given that the meteorological knowledge and experience of the students varied widely. However, they “managed the problem admirably, keeping mathematics to a minimum and making the lectures both understandable and interesting to all”. On most days, there were two lectures in the morning and there was field work in the afternoon.

Working in groups, all students had a chance to handle the various meteorological instruments. In addition, pilot balloons were released and followed with theodolites, one of them for a full fourteen minutes. An effort was made to construct a constant-height balloon, but it was unsuccessful, the students’ conclusion for the failure being, Reason said, “that the air must have been in a state of great instability”! The climax of the course was a visit to Hemsby Radiosonde Station, where the students were able to watch a balloon released and tracked and also see the lightning flash detector at work.

Dr Roach, said Reason, “had prepared for the worst, having provided experiments on raindrop size and distribution”. In the event, however, the amount of rain recorded in the whole week was only 0.06 inches! In other field work, wind speeds were measured at varying heights, and thermocouples were employed to measure temperature at six levels above the ground. Results were analysed in the laboratory in the evenings, after which talks were given.

In one such talk, Dr H E Klieforth and Dr Roach spoke about the weather they had experienced in the Pyrénées. In another, Mr F H Ludlam spoke on cumulus clouds and their development, including “some entirely new material from recent investigations”. On the Saturday evening, Mr M E Schoenberg chaired a Brains Trust.

THREE COURSES IN 1958

In 1958, there was again a course for undergraduates at Malham Tarn, and there were two courses at Preston Montford, one on Weather and Flight, the other a meteorology course for sixth-formers. All three were held in conjunction with the Field Studies Council (*Q.J.R.Met.S.*, 1959, **85**, 365, p.302).

The course at Malham Tarn

The report on the course at Malham which appeared in *Weather* in October 1958 (**13**, 10, pp.350-352) was written by J A Kington, a student on the course. He reported that the number of course participants had been 25, directed by Mr C E Wallington of the Meteorological Office and Mr P M Saunders of Imperial College, London.

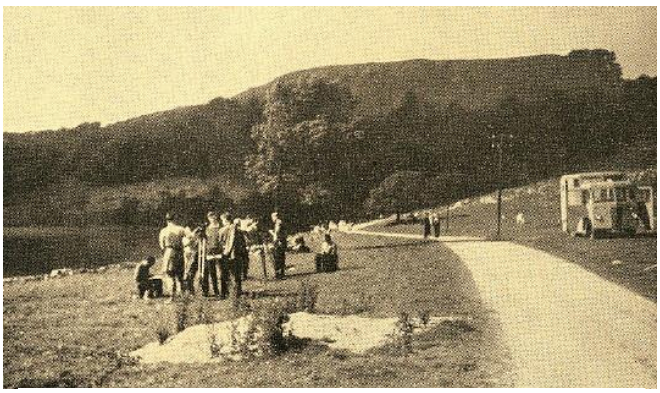
The week's programme (from 20 to 27 August) had been similar to that of previous years, with lectures on the physical and dynamical basis of meteorology and instruction on the making and analysis of weather observations. "However", Kington said, "the emphasis of the course was toward simple out-of-door experiments and field investigations carried out by students themselves".

As in previous years, there had been excursions before breakfast to notable parts of the surrounding countryside, which had usually included, Kington said, "close hand experience of hill fog or low stratus, and provided a good talking point over breakfast to those companions who had not been tempted to rise so early!". A short discussion of the general synoptic situation had come after breakfast, making use of information provided by meteorological staff of the Air Traffic Control Centre at Preston.

Many instruments had been available, the majority of them loaned by Short and Mason Ltd and demonstrated by Mr E J W Spence of that firm. They had included maximum, minimum, earth and solar radiation thermometers, thermographs, psychrometers, hydrographs, rain-gauges, and nephoscopes. They had been employed in various sites and exposures and provided some notable measurements, for example: a drop of 8°F in air temperature just before a thunderstorm one afternoon; fresh water flowing into the Tarn 10°F cooler than the main body of water; a rainfall catch under coniferous trees only 25% of that under deciduous trees; and a grass minimum temperature of 32.4°F one night.

Directed by Mr Saunders, Kington reported, "several students investigated the size and frequency of raindrops in various types of rainfall by exposing dyed filter papers". And directed by Mr Wallington, "a number of students attempted to determine values of the roughness parameter over various natural surfaces in the locality with twin cup anemometers mounted at 1 and 2 metres above ground". Pilot balloons were employed to investigate wind flow over ridges.

As usual, there had been evening lectures. Miss N J Gordon of the Malham Field Centre Staff had introduced the complex geology and geomorphology of the local area. Dr R G Picknett of Imperial College had given an original talk on the meteorology of caves and pot-holes which had been illustrated with many colour slides of stalagmites and stalactites. Mr Saunders had spoken about the techniques and equipment for successful cloud photography, both still and time-lapse. Mr E N Laurence of the Meteorological Office had taken as his topic 'Meteorology in agriculture'; and



Malham Tarn, August 1958: students carrying out pilot balloon work. From Kington (1958), p.351. Photograph by J A Kington, reproduced by kind permission.

Commander F H W Green had spoken on nature reserves and the functions of the Nature Conservancy. To round off the course, there had been a quiz, set by the staff, the winners being rewarded, Kington said, with “useful meteorological prizes”.

The meteorology course at Preston Montford

A report on this course, by one of the students, J T Collier, appeared in *Weather* in January 1959 (**14**, 1, pp.26 and 29). The course ran from 30 August to 6 September 1958, directed by Mr J Hallett of Imperial College and Dr W T Roach of the Meteorological Research Flight, Farnborough. They had faced quite a challenge, as only three of the students had any previous knowledge of meteorology.

Each day began with a brief discussion of the current weather situation based on information provided by the Forecast Office at Shawbury, after which, until mid-morning, lectures were given on a range of topics, including cloud and rain formation, observational techniques, and the Earth’s radiation budget. The rest of the day was spent on field work or the analysis of weather charts.

A Stevenson screen was erected and various instruments were placed on the lawn of the field centre, among them anemometers and a thermocouple mast. Many balloons were released, and on two occasions Dr Roach took groups of students to a point near Preston to participate in double theodolite observations of balloon ascents and the growth of cumulus towers. Messrs Short and Mason supplied much of the equipment used on the course, and Mr E J W Spence of that firm was, Collier said, “a welcome visitor”, who “described in detail the construction and use of thermometers and barometers”.

One evening, a survey of a local frost hollow was conducted. A temperature difference of 5°F between the top and bottom of a ten-foot thermocouple mast was observed, and downward flow of air near the banks of the River Severn was detected, but, as Collier commented, “the experiment was not a very controlled one and no definite conclusions were reached”.

Other activities included a study of a local thunderstorm and “a tramp over the Long Mynd in cloud and drizzle in which lee-side eddy flow was demonstrated by [soap] bubbles released from different heights”.

Evening lectures were given by Mr Hallett and Dr Roach on their recent expedition to the Pyrénées, Mr E T Stringer of Birmingham on microclimatology, and Dr J W Glen, also of Birmingham University, on the mechanism of glacier flow.

The course on Weather and Flight at Preston Montford

An advertisement for this course appeared in *Flight* magazine on 14 March 1958 (p.350), where it was stated that the course, from 20 to 27 September, was “designed for airmen, meteorologists, physicists and mathematicians who were interested in the practical aspects of aeronautics”. The course would be run by the Extra-Mural Studies Department of the University of Birmingham in collaboration with the Field Studies Council and the Royal Meteorological Society.

A report on the course was published in *Weather*, in the issue for January 1959 (**14**, 1, pp.29-30). Written by one of the students, F J Edwards, it did not give the number of course members but did say that about half of them were servicemen, mainly from the RAF, the other half civilians “attracted either by their interest in gliding and soaring or in a career in meteorology”. The course was directed by Dr R S Scorer and broadly divided into three sections.

Lectures on aerodynamics were delivered by Mr J L Stollery of the Department of Aeronautics, Imperial College, covering low-speed flight, the trans-sonic ‘barrier’, supersonic flight, vertical take-off, hypersonics and space travel. In so doing, he made use of films which, “with remarkable clarity”, showed air motions in the vicinity of aerofoil surfaces at various flight speeds.

Dr Scorer gave lectures on various aspects of atmospheric motion, including cloud types and formations, convection, mountain waves and, as Edwards put it, "a lucid exposition of the use of the tephigram". He also described and analysed the economic problem of smoke and atmospheric pollution, "aided by a series of colour slides which illustrated far more graphically than mere words the magnitude of this problem". In addition, Mr J Findlater explained "how much can be achieved by the amateur in chart drawing based only on an intelligent appreciation of the Official Shipping Forecasts and reports from coastal stations broadcast by the BBC".

The third section of the course contained lectures on a variety of topics. Dr G V T Matthews of the Severn Wildfowl Trust spoke about the navigation of migrating birds, and Dr R C Rainey of the Anti-Locust Research Unit took as his subject relationships between meteorology and the flight of locust swarms. Mr G L Stollery FRPS gave two lectures on photography which brought home to the students the value of photography, particularly colour photography, for recording skyscapes in general and cloud forms in particular.

There were outdoor activities each afternoon, these including wind finding, cloud observations, studies of airflow by means of smoke and balloons, and an investigation of airflow over and around the Wrekin which showed, Edwards said, "how very complicated flow can be, even in the vicinity of such an isolated hill". A highlight of the course was a visit to the Midland Gliding Club on the Long Mynd.

DEVELOPMENTS IN 1959

The annual report of the Royal Meteorological Society for the year 1959 contained an important announcement in respect of the Society's field courses (*Q.J.R.Met.S.*, 1960, **86**, 369, p.416):

> During the year the Carnegie Trust generously agreed to make a grant to the Society for the encouragement and promotion of field studies. The Society has thus been enabled to plan courses covering a far wider range of field study than has been possible in the past.

It was noted later in the annual report (*op.cit.*, p.418), that four courses had been held in 1959 in conjunction with the Field Studies Council: one at Malham, two at Preston Montford, and a new course, in oceanography, based at Dale Fort Field Centre in Pembrokeshire.

A course was held at Preston Montford in April 1959 (see below) and an advertisement for the other three 1959 courses appeared in *Weather* in May 1959 (**14**, 5, p.169), including the information that the Royal Meteorological Society was "prepared to consider applications for financial assistance in attending field study courses in meteorology from those who have grants from no other source".

The meteorology course at Preston Montford in April 1959

A whole page of the January 1959 issue of *Weather* (**14**, 1, p.31) was devoted to an advertisement for a meteorology course at Preston Montford from 8 to 15 April 1959, organized by the Society and the Field Studies Council. The lecturers were to be Dr G B Tucker of the Meteorological Office and Dr J Hallett of Imperial College, and there would be two Special Lecturers, Mr F H Ludlam of Imperial College and Dr R J Murgatroyd of the Meteorological Research Flight.[6]

The advertisement went on to say that the course would be particularly suitable for sixth-form students, introducing them to field work which would "make them more conscious of their meteorological environment". Outdoor exercises would involve theodolite observations of balloons and cloud-tops, investigations of the wind in the lowest three metres of the atmosphere, and micrometeorological studies of various plant habitats, including, if possible, "detailed temperature

[6] In 1958, when John Hallett helped direct the meteorology course at Preston Montford, he had not yet received his PhD (in cloud physics from Imperial College), hence the title 'Mr' at that time.

and humidity measurements in a cold hollow under a clear sky at night". The students would present the results of their field work themselves on the final day of the course in the form of short papers.

Selected observations would be obtained from a nearby Meteorological Office, and synoptic charts would be plotted and analysed. Morning lectures would "provide the background for the fieldwork and outline the basic physics of meteorology". In addition, a visit would be arranged to the Midland Gliding Club at the Long Mynd, where it was "hoped to study air-flow over hills by observing gliders in flight". The advertisement concluded with a detailed day-by-day timetable of lectures.

There was no subsequent report on the course in *Weather*.

The course on Weather and Flight at Preston Montford

Information about a course on Weather and Flight to be held at Preston Montford from 19 to 26 September 1959 appeared in the June 1959 issue of *Weather* (**14**, 6, pp.216-217), including an outline syllabus, the planned programme of field work and the proposed timetable of lectures. As in 1958, the course would be organized by the Extra-Mural Studies Department of the University of Birmingham in collaboration with the Field Studies Council and the Royal Meteorological Society. The lecturers would be Dr R S Scorer and Mr J L Stollery of Imperial College, Mr J Findlater of the Meteorological Office Training School, and Mr G L Stollery of the Royal Photographic Society. There would also be evening lectures by Mr W G Harper of the Meteorological Office and Dr R C Rainey of the Anti-Locust Research Unit.

A report on the course appeared in the November 1959 issue of *Weather* (**14**, 11, pp.361-365). By K G Jones, a teacher of meteorology to airline pilots and navigators but on this occasion one of the students, it provided a great deal of information about the course and was written in a refreshingly informal style. Jones said that he had enjoyed the course "immensely" and thought everyone else had, too, including the instructors, which he considered "the acid test for the success of any course". Dr Scorer, Jones added, had quickly established the temper and tempo of the course and soon communicated his "unbounded energy, enthusiasm and good humour to all". Indeed, said Jones, "some were so beguiled as to get up – voluntarily – to view the splendours of sunrise", something he himself had not done for about twenty years!

For the most part, the weather had been excellent, allowing field work to be carried out each afternoon. One day, however, there had been steady frontal rain, an unusual event in the sunny, warm, dry summer of 1959. Field studies of air motions and temperatures near the ground and up hillsides had involved smoke canisters, hand anemometers, Assmann psychrometers, spring balances, pilot balloons and theodolites, while experiments in aeronautics, directed by John Stollery, had been, Jones reported, "confined to the performance of rockets – of the 4d. and 6d. firework variety – and some of these missiles were made to perform evolutions far more spectacular than the manufacturers can ever have dreamed of"! Other field activities had included visits to the Midland Gliding Club at the Long Mynd, where thermals and air-flow over hills had been studied and opportunities for passenger flights provided for all of the students who wished to make one.

As on the Weather and Flight course in 1958, Mr Findlater had explained how to construct surprisingly adequate synoptic and forecast charts from information contained in shipping forecasts broadcast by the BBC.

An evening lecture by Mr Harper had been entitled 'Radar, Rain and Angels' and provided evidence that 'angels', the expanding rings of echoes seen on radar screens at dawn, were associated with flocks of starlings spreading out across the countryside from their nocturnal roosts. This conclusion had been queried, however, by an RAF radar officer who said that he had seen unidentified echoes at 40,000 feet which had moved against 50 knot headwinds. All agreed, including Mr Harper, that the echoes the officer described could not be attributed to starlings and remained a mystery.

The evening lecture by Dr Rainey had provided an authoritative account of the desert locust, swarms of which, it appeared, merely drifted with the wind, with, as Jones put it, "individual insects keeping fairly close to one another to avoid dispersal". Convergence into areas of rainfall took the locusts into moist conditions which favoured their breeding.

In summary, Jones considered the course "all good instructive fun", with "never a dull moment".

The oceanography course at Dale Fort

Advance information about the new course in oceanography was published in the June 1959 issue of *Weather* (**14**, 6, p.216). To be held at Dale Fort Field Centre, Pembrokeshire, from 26 August to 2 September 1959, and organized by the Centre's Warden, the course would be principally for students of mathematics, physics and chemistry at sixth form or first-year university level, but it would also be suitable for students of biology or geography who possessed sound backgrounds in mathematics and physics.

No attempt would be made to cover the whole field of oceanography. Rather, the emphasis would be, to quote the notice in *Weather*, on the "analysis and interpretation of results obtained over a fairly limited area". Most of the field work would be carried out, weather permitting, in a 30-foot motor fishing boat, and there would also be laboratory work ashore. The subject areas covered by the course would be Hydrography, Physics, Chemistry, and Biology.

A report on the course, by a student, R H A Stewart, was published in *Weather* in October 1959 (**14**, 10, p.327). The course had been directed by Mr J B Rigg of Watford Grammar School and clearly been successful and enjoyable. Sunshine had been almost unbroken, Stewart said, with light winds, "and the sea smooth enough for the most delicate stomach".

He went on to say that soundings and temperature measurements had soon been mastered, "but such things as extinction coefficients and salinities had taken longer". Salinity measurements could not be completed afloat. Water samples had to be collected and taken back to the laboratory where, as he put it, "after much brushing up of almost forgotten chemistry and much staining of hands with silver nitrate, the salinities were determined".

A whole day of the course was given over to the study of waves, for which, to supplement the students' own observations, an automatic wave recorder was available, lent by the National Institute of Oceanography. The weather had not, however, cooperated, there being light winds and therefore a shortage of sizeable waves.

Because observations are of little value if their positions are not known, elementary navigation was included in the course, with students learning to use the prismatic compass and the sextant. Observations were plotted on base maps in the evenings and a simple oceanographic chart of Dale Roads and surrounding waters thus produced.

Stewart ended his report with "the tale of our greatest failure":

> It is said that if a bottle containing melted jelly is lowered to the sea bed and anchored, then the bottle will tilt under the influence of the current and when the jelly sets the angle that its surface makes with the wall of the bottle can be made to give a measure of the speed of the current. Of course I am sure it's true, but there seems to be something about the water at Dale which prevents jelly setting, and after the fifth attempt the smile on the face of Harold the boatman had a slightly disbelieving look about it!

The meteorology course at Malham Tarn

A short report on the meteorology course held at Malham Tarn from 19 to 26 August 1959 was published in *Weather* in November 1959 (**14**, 11, p.365). Written by one of the students, F A Haverson, it included the disappointing information that only six students had "availed themselves of this interesting and instructive course". The course directors had been

Mr C E Wallington of the Meteorological Office and Dr D H McIntosh of Edinburgh University, assisted by Mr E J W Spence of Short and Mason Ltd.

As on previous meteorology courses at Malham Tarn, mornings had been devoted to theoretical work and afternoons to practical work, each day beginning with a brief discussion of the current weather situation, using information from the Meteorological Office at Preston. Theoretical work had included studies of cloud classification, convection, lee waves, jet streams and long-range forecasting, while practical work one afternoon had involved anemometer and psychrometer readings along a traverse of a local hill. Another afternoon had been devoted to the measurement of relative humidities over the Tarn and their correlation with wind force and direction, topography and surface water temperatures. Pilot balloons had also been tracked, using double theodolites on either side of the Tarn, but even this lengthy baseline had proved insufficient when the plan positions of the balloons had been plotted.

EIGHT COURSES IN 1960

The annual report of the Royal Meteorological Society for 1960 again acknowledged the Carnegie United Kingdom Trust, as in 1959, saying that an additional course and extended programmes had been initiated with generous financial support from the Trust (*Q.J.R.Met.S.*, 1961, **87**, 373, p.444). The Balance Sheet of the Society for 1960 showed that the amount due from the Carnegie Fund was £463 (*op.cit.*, p.453).

Information about the courses held in 1960 was summarised thus in the annual report (*op.cit.*, pp.447-448):

> During the year, five vacation courses were held in conjunction with the Field Studies Council: one at Malham Tarn, two at Preston Montford and two at Dale Fort, Pembrokeshire, of which last, one, on 'Weather and Bird Movements', was new. The total number of students who attended these courses in 1960 was about 80. In association with the British Gliding Association, week-end courses were held at Lasham, Long Mynd and Dunstable and a new programme was started at the Scottish Gliding Union at Kinross. … Council is appreciative of the work of Dr R S Scorer and his chief instructors, Dr D H Mcintosh, Mr J B Rigg, Dr R P Pearce, Mr D E Pedgley, Dr G B Tucker and Mr C E Wallington in organizing and operating these courses.

No reports on the gliding courses were published in *Weather*.

The course at Malham Tarn

An advertisement for the course at Malham Tarn appeared in the March 1960 issue of *Weather* (**15**, 3, p.105). The course would run from 7 to 14 September and be directed by Dr D H McIntosh of Edinburgh University's Department of Natural Philosophy, assisted by Mr J Findlater of the Meteorological Office and Mr E J W Spence of Short and Mason Ltd. As in previous years, the course would be suitable for undergraduates in physics, mathematics or geography, as well as for school teachers, "keen amateur meteorologists and Service personnel with a professional interest in meteorology". The programme for the course would again include lectures and films on various aspects of synoptic and physical meteorology supported by practical work indoors and out of doors. The final afternoon would be devoted to reports of students' own field experiments. The inclusive cost of the course would be £8, and students of most universities would qualify for a reduction of £1 10s. 0d.

A report on the course by Anne Clough, one of the students, appeared in *Weather* in December 1960 (**15**, 12, pp.424-425). The course had attracted fourteen students, including, Anne said, "some would-be meteorologists, some as part of a degree course, and some from sheer curiosity to know more about the Englishman's eternal topic of conversation – the weather".

The daily programme had followed a now familiar pattern for courses at Malham Tarn (and, indeed, other places where Royal Meteorological Society meteorology courses were held). Morning sessions had begun with synoptic chart work, after which lectures had been given on mathematical and physical aspects of meteorology, including "the intricacies of the tephigram". Afternoons had been taken up with practical work, for which a range of instruments had been provided, including hygrometers, anemometers, earth thermometers, and a pair of solar radiation thermometers. The most exhausting work, Anne said, was "checking the rain-gauges which were spread over a wide area". Afternoon sessions had also included the tracking of balloons with the aid of two theodolites loaned from the Meteorological Office. On the Sunday, there had been no lectures, but there had nevertheless been field work of an energetic kind, with students and instructors tramping across the moors to view cave mouths and potholes, after which all had climbed Pen-y-Ghent.

Evening lectures had included one by Mr J Paton, on light and colour in the sky, and another by Mr W G Harper, on the use of weather radar to study migratory and other bird movements. The last evening of the course had been taken up with a quiz "and the allocation of prizes for the results".

The course on Weather and Flight at Preston Montford

An advertisement for the Weather and Flight course at Preston Montford appeared in *Weather* in May 1960 (**15**, 5, pp.179-181). Once again, the course would be organized by the Extra-Mural Studies Department of Birmingham University in collaboration with the Field Studies Council and the Royal Meteorological Society. The overall Director of Studies would be Mr C E Wallington of the Meteorological Office, assisted by three lecturers, namely Dr A J Taylor-Russell of Imperial College, Mr D E Pedgley of the Meteorological Office Training School and Mr G L Stollery of the Royal Photographic Society. Evening lectures would be given by Dr R S Scorer of Imperial College and Dr R J Murgatroyd of the Meteorological Office Research Flight.[7] The fee for the course would be £9 5s. 0d., inclusive of board, accommodation and tuition. The course would run from 17 to 24 September 1960.

The object of the course would be to study current weather, winds and eddies, cloud forms, the use of photography (especially in colour), and aerodynamics, ranging from the natural flight of insects and birds to man-made flying machines which travelled at various speeds, including low-speed flight (gliders) and transonic, supersonic, hypersonic and space flight. There would be lectures in the mornings and evenings, illustrated by lantern slides and ciné films. Afternoons would be spent in the field using smoke, balloons, thermometers, anemometers and other instruments to study temperatures near the ground and up hillsides, wind-flow near the ground, air motions in the lee of obstacles, ground moisture, winds aloft, the flight of a rocket, river motion and water waves. There would also be trips to the Midland Gliding Club at the Long Mynd, with students split into two parties. The trip on the Tuesday would be led by Mr Wallington, the one the following day by Mr Pedgley.

A report on the course by David Pedgley appeared in *Weather* in March 1961 (**16**, 3, pp.88-89). This revealed that the course had been fully subscribed, with 24 students.

Each day, David said, he tried to explain the weather "outside the window" using charts obtained from forecasts and coastal reports broadcast by the BBC. "No one could complain", he added, "that we did not have enough variety of samples to study – gales, rain, drizzle, thunder, fog and even some sunshine"; and he went on to say that:

> Almost every imaginable cloud type was laid on for our enjoyment. Even the rain was put to good use by catching its drops on dyed filter papers so that from the resulting stains we could examine the variations of drop sizes.

[7] Dr Murgatroyd's initials are incorrectly given as R G in the *Weather* advertisement.

Only for the students who took part in the second of the trips to the Long Mynd did the weather prove disappointing, with rain and low cloud restricting planned activities.

Lectures on meteorology and aerodynamics were given during the mornings and evenings, with, in David's words, "the emphasis on weather study largely on motion of the atmosphere and how it brings about the variety of cloud forms". Fronts and jet streams and local weather such as sea breezes, showers and thunderstorms were also covered. Afternoons were given over to field work, which included attempts to measure minimum temperature and rainfall in relation to the exposure of instruments, as well as the variation of wind speed with height above the ground and the effects of hills on wind flow. The term 'Field', David wrote, comprised "a wide range of topographical features including thickets, hills and rivers".

Dr Scorer gave an evening talk about smoke, and Mr F Singleton (not, in the event, Dr Murgatroyd) spoke about the work of the Meteorological Research Flight.

The meteorology course at Preston Montford

A report on the meteorology course held at Preston Montford from 6 to 13 April 1960 was published in the September 1960 issue of *Weather* (**15**, 9, p.317). Written by two students, Jennifer Robinson and Michael Williams, it gave the number of students as seventeen and the names of the instructors as Dr G B Tucker and Dr J Hallett, assisted by Mr Peter Deeks.

As on other meteorological courses, there had been lectures on meteorological theory in the mornings and "descriptive lectures with the aid of slides and films in the evenings". The main emphasis of the course had been placed on field work, which had generally, but not exclusively, taken place in afternoons. Screen observations had been made at 7.30am and 6.30pm each day.

The field work had included wind speed and temperature measurements in the lowest two metres of the atmosphere and atmospheric turbulence experiments. Mainly, though, it had consisted of tracking balloons with theodolites. Some balloons had been launched at night with a candle lantern attached to them so that they could be tracked against a background of stars. On one occasion a zero-lift balloon had been created and launched successfully, but it had unfortunately floated into poplar trees and become firmly fixed. A nearby frost hollow had been investigated one evening, but this endeavour, too, had failed to go to plan after a promising start. The initially clear, calm conditions had been disturbed by the wind springing up. Such are the joys of experimental science!

On the Sunday, there was, as Robinson and Williams put it, "an expedition to Long Mynd". The main object of the visit was, they said, "to study air currents by watching some gliding". Unfortunately, the wind was too strong to allow gliders to take off safely, but the students nevertheless made good use of their visit. On the ascent of the Long Mynd (elevation 1,693 feet), they measured dry- and wet-bulb temperatures every 100 feet with whirling psychrometers. They also took anemometer readings and recorded gusts of up to 60 knots. Bubbles and smoke generators were used to observe eddies in a valley.

One day, a visit was made to the meteorological office at RAF Shawbury, where students were able to see weather reports being received from Dunstable via teleprinter. As Robinson and Williams noted, "a relatively new piece of equipment, a 'facsimile' for the automatic transmission of charts, aroused much interest".

There were two visiting lecturers. Mr P Jeffreys gave an illustrated talk about an Antarctic Expedition, and Dr W T Roach spoke about the Meteorological Research Flight.

The oceanography course at Dale Fort

In her report, published in *Weather* in November 1960 (**15**, 11, p.385), Juliet Wain mentioned that Mr J B Rigg had again directed the oceanography course (as he had the previous year) and the number of students attending the 1960 course had been eleven. The course had run from 31 August

to 9 September, and, in contrast to the previous year's course, the weather had been unsettled, with, Juliet said, "heavy rain and a swell sufficient to upset the less hardy stomachs".

At least this meant there were waves to be measured, unlike the situation the previous year. To make these measurements, two methods were used. The first was to float a scale 10 feet long upright in the water by means of a weight attached to one end, the assumption being that the level of the scale would be constant if the weight was suspended sufficiently far below the zone of water which was disturbed by wave motions. Waves were also measured by a recorder loaned by the National Institute of Oceanography, which, as Juliet explained, " worked on the principle that the passage of a wave causes a change in pressure at a constant distance above the sea floor".

The programme of lectures and field work had been much the same as in 1959, covering many aspects of chemical, physical and biological oceanography, but some difficulty had been experienced when trying to obtain readings of temperature variation with depth. In Juliet's words, "the apparatus involved refused to function", and when, "after persistent efforts, it was finally put in working order, it proved too insensitive to the small changes involved"!

Overall, the course had been successful, bringing together, as Julie said, "a group of people of differing ages and qualifications". In her view, one of the greatest successes of the week had been "the way in which cooperation developed between people meeting for the first time, and studying a subject of common interest".

The course on Weather and Bird Movements at Dale Fort

An advertisement for this new course appeared in *Weather* in May 1960 (**15**, 5, p.182). The course would be directed by Dr R S Scorer of Imperial College and Mr Ken Williamson of the British Trust for Ornithology and run from 21 to 28 September 1960 as a joint venture between the Trust, the Field Studies Council and the Royal Meteorological Society. The fee for the course, inclusive of residence and tuition would be £8 per person, with a reduction to £6 10s. 0d. for students at universities which had a special arrangement with the Field Studies Council.

The course would be open to all with previous knowledge of either ornithology or meteorology and would focus upon the flight of birds and insects in response to air movements on various scales, from small-scale turbulent eddies to fronts, anticyclones and, indeed, prevailing winds of the globe. Guest lectures would be given by Dr R C Rainey, on 'Locusts and weather', and Mr W G Harper on 'Radar observations of birds and weather'. In addition, a day would be spent on the island of Skokholm, weather permitting.

A report on the course by Dr Scorer was published in *Weather* in December 1960 (**15**, 12, pp.422-423). He did not give the number of students but did say that "most of the members of the course were fairly mature ornithologists with a very rudimentary knowledge of meteorology and little understanding of the physics of the atmosphere". He hoped more meteorologists would go on the course in future, promising them that "a 'new dimension' would be added to their appreciation of the atmosphere".

In the lectures, Ken Williamson explained how the migration of birds is typically triggered by the light winds of anticyclones or cols, after which the birds can be carried off their intended courses if they become disoriented in the thick cloud of fronts and then drift downwind. A probable example of this phenomenon was provided by the sightings of Grey Phalaropes on Skokholm, which Ken attributed to the birds being swept across the North Atlantic by a depression a few days earlier whilst attempting to migrate from Greenland into North America.

COURSES IN 1961

According to the annual report of the Royal Meteorological Society for 1961 (*Q.J.R.Met.S.,* **88**, 377, p.350), eight field study courses were held that year. Four of these, each of a week's duration, were arranged in conjunction with the Field Studies Council: one at Malham Tarn, one at Preston Montford and two at Dale Fort. In addition, there were two weekend courses in collaboration with the British Gliding Association, one at Lasham (Hampshire), the other at the Long Mynd (Shropshire), and there was also a programme of meteorological activities at Portmoak (Kinross) from May 1960 to September 1961 in association with the Scottish Gliding Union. In fact, five week-long courses were held in 1961, for there was again a Weather and Flight course at Preston Montford organized by the Extra-Mural Studies Department of Birmingham University in association with the Royal Meteorological Society.

Council again acknowledged the "generous financial support from the Carnegie United Kingdom Trust" which would amount to £500 *per annum* for the next four years. Council was also "highly appreciative of the work of Dr R S Scorer and his team of instructors" and named Dr D H McIntosh, Mr K Williamson, Mr J B Rigg, Dr J M Rushforth, Dr R P Pearce, Dr J L Monteith, Dr G B Tucker, Mr C E Wallington, Mr D E Pedgley and Mr J Bayliss.

Meteorology at Malham Tarn

An advertisement for the Malham course was published in *Weather* in June 1961 (**16**, 6, p.201). The course would run from 6 to 13 September 1961 and be suitable for undergraduates in physics, mathematics or geography, as well as for school teachers, keen amateur meteorologists and "Service personnel with a professional interest in meteorology". The course would be directed by Dr D H McIntosh of the Department of Natural Philosophy, University of Edinburgh, assisted by Mr J Findlater of the Meteorological Office and Mr E J W Spence of Short and Mason Ltd. The programme of lectures and field work would be similar to that of previous years and there would again be talks in the evenings by visiting lecturers. The inclusive cost would be £8 per person, with a reduction of £1 10s. 0d. for students of most universities.

Conveniently, reports on courses held in 1961 all appeared in the December 1961 issue of *Weather* (**16**, 12, pp.412-417), with one exception; there was no report on the week-end course held at the Long Mynd. The report on the course at Malham, by Dr McIntosh, appeared on pages 415-416.

There had been, he said, eleven students, among them teachers, lecturers, undergraduates, sixth-formers and an RAF navigator. As usual, morning sessions had been devoted to lectures, "interrupted by a session of plotting and analysis of a short selection of current synoptic data kindly supplied by the meteorological office at the Air Traffic Control Centre, Preston". Field work had been carried out in the afternoons, taken up mainly with balloon work and with temperature, humidity and surface-wind traverses. Evening lectures had included one by Professor Manley on 'Some effects of hills', as well as one by Dr R P Pearce on 'Convection' and one by Mr J Paton on 'Exploring the upper atmosphere'. There had also been pre-breakfast excursions to Gordale Scar and to Malham Cove, both of which had attracted full attendances.

On the Sunday, there had been a trip to Ingleborough Cave and to Gaping Gill, with the visit to the latter being 'rescued' by the skill of the RAF navigator, for he had been able to locate it in the thick fog which had obscured it when other students had failed to find it.

Meteorology at Preston Montford

A short report on this meteorology course was published (*op.cit.*) on page 412. Twelve sixth-form students had attended the course, directed by Dr G B Tucker of the Meteorological Office with the assistance of Dr J L Monteith of the Rothamsted Experimental Station, and the course had run from 5 to 12 April 1961. The report was unsigned.

The weather had proved disappointing, with “for most of the course winds practically non-existent up to about 2,000 feet, while at this level a grey amorphous complete cloud cover had its base”. Thus, pilot balloons had risen practically vertically, but a positive to this had been that students had gained “a fair amount of practice in using the theodolite”. Despite the weather, however, the field work had proved very successful, “thanks largely to the radiation instruments, thermocouples and potentiometer obtained from Rothamsted”.

Lectures had been held in the mornings, and so, too, had the plotting and analysis of current data obtained by telephone from RAF Shawbury. Field work had been carried out in the afternoons. In addition to work with pilot balloons, thermocouples had been constructed and thermocouple sets assembled for soil and air temperature profiles. The portable potentiometer had also been used. Air temperatures had been measured up to a height of one metre using a fixed mast and up to 15 metres using tethered balloons; and earth temperatures had been measured to a depth of 30cm.

There had been two excursions: one to the Long Mynd, the other to the meteorological office at RAF Shawbury.

Weather and Flight at Preston Montford

A very brief unsigned report on the Weather and Flight course was published *op.cit.* on page 416. The course, from 16 to 23 September 1961, had been directed by Mr C E Wallington, and the instructors had been Dr A J Taylor-Russell, Mr D E Pedgley and Mr G L Stollery. There had been sixteen students, of whom one, a professional meteorologist from Israel, had come to England primarily to attend the course, while another was from McGill University, Canada. The programme for the course had been much the same as in previous years and the weather had been “kind to us but lacked the variety of the previous year’s course”.

Oceanography at Dale Fort

A report on this course, by a student, Susanne Cole, was published *op.cit.* on pp.412-414. The course had run from 30 August to 5 September 1961 and again been directed by Mr J B Rigg. There had been twelve students, one a school-master, the others sixth-formers (eight boys, three girls). Most of the latter had science backgrounds (physics, chemistry, zoology, botany). Of the others, two were students of history and geography, one combining these subjects with economics, the other English.

During the course, measurements were made of salinity and sea-temperature distributions, light penetration into the sea, dissolved oxygen and organic matter in sea water, sub-surface currents, sizes of sediments, and wave height, length and speed. Instruction was also provided in the use of a sextant, a prismatic compass, tide and tidal diagrams, a towing plankton net, and an oyster dredge. One day was devoted to a study of the coastline, including analyses of sand and shingle sediments collected at Marloes Sands.

Throughout the course, Susanne reported, the weather had been fine and sunny with light winds, “apart from a rather high sea which upset several people on a trip to Skokholm”. Overall, she said, the course had been “very enjoyable, involving plenty of action and practical work as well as theory, in which everyone was able to play a part”.

Weather and Bird Movements at Dale Fort

The report on this course (*op.cit.* pp.414-415) began with welcome words: “the course was over-subscribed”. The number of students had been fourteen, but this may seem a small number, especially compared with the numbers attending meteorology courses at Malham in the early 1950s. However, as the author of the report, G S P Heywood, a student, further said, “the course was designed to present those aspects of meteorology and ornithology which bear upon one another and encourage the occupations of bird-watching and weather observations as field studies which can be pursued simultaneously”. Birds are easily disturbed, causing disappointment for people

whose interest is primarily bird-watching. The greater the number of students, the more likely it is that birds will fly away or take cover in bushes, especially, as can happen on bird-watching expeditions if some of the bird-watchers are talking or otherwise not as quiet as is desirable.

The course ran from 6 to 13 September 1961, directed by Dr R S Scorer of Imperial College and Mr K Williamson of the British Trust for Ornithology, assisted by Mr D E Pedgley of the Meteorological Office.

In the morning sessions, there were lectures. Initially, Dr Scorer introduced the fundamentals of dynamical meteorology and the principal features of weather systems, and Mr Williamson spoke about bird migration and the work of bird observatories. Soon, though, as Heywood put it, "these two lines of study converged, and before long Mr Williamson was showing weather maps to illustrate the influence of winds and fronts on bird movements". Soon, too, Dr Scorer was explaining how birds exploit thermals over land and soar dynamically over ocean waves. After lunch, Mr Williamson led expeditions to nearby estuaries or tidal-flats to watch wading and other birds, and evening sessions were spent viewing films and colour slides. "Most of the latter", Heywood said, "were from Dr Scorer's seemingly inexhaustible collection of cloud studies, all of them interesting and some of great beauty". There were also lectures in the evenings by visiting speakers. Dr R C Rainey of the Anti-Locust Research Centre spoke about the movements of locust swarms in relation to winds (see Rainey, 1969); and Mr W G Harper of the Meteorological Office Radar Research Unit presented evidence that the 'angels' observed on radar screens were indeed birds.

It was a regular occurrence for students to assemble on the headland above Dale Fort at about 6.30am each day to see the sun rise, discuss overnight cloud and weather changes and observe any bird movements that were already taking place at that early hour or had taken place during the night. A few hardy students, however, engaged in additional physical field work which involved making measurements of temperature in the air, at the grass surface and at depths of 1 inch, 2 inches, 4 inches and 12 inches, as well as in the sea, to investigate the extent to which any changes were weather-related. In Heyword's words, "this exercise involved getting up in the middle of the night to read the thermometers every two to three hours". Field work also included experiments with smoke candles in the lee of a cliff to demonstrate upward eddies which could be exploited by young sea-birds when making their first flights from cliff ledges.

Heywood reported that "almost every kind of weather was experienced during the week", but a visit to the bird observatory on the island of Skokholm, led by Mr Pedgley, was blessed with "a day of warm sunshine and sparkling seas", with students able to watch the formation of a thermal over the neighbouring island of Skomer.

Week-end meteorology course at Lasham Airfield

A very brief unsigned report on the course held at the Clubhouse of the Lasham Gliding Society from the evening of Friday 13 October to the evening of Sunday the 15th was published *op.cit.* on page 416. The course had been directed by Mr C E Wallington, and the principal aim of the course had been "to promote out-of-doors observations as a means of understanding the ways of the weather".

The programme for the course contained some flexibility, for it was stated in the report that the afternoons had been left available for "either out-of-doors experiments and instruction or club flying according to the individual wishes of the members". Lectures had been given in the mornings and evenings.

Meteorology and Gliding in Scotland

Information about the meteorological activities carried out at Portmoak by Dr J M Rushforth and Dr R P Pearce of Queen's College Dundee's Department of Mathematics during the period May 1960 to September 1961 in association with the Scottish Gliding Union appeared *op.cit*. on page 417. These activities had taken the form of weekly courses during the summer months for pupil pilots,

with talks on meteorological aspects of gliding. The talks had usually been given in the evenings, and lectures and demonstrations also given during the summer months for club members, with the additional benefit of opportunities to track and observe pilot balloons. Lectures had usually been concerned with the collection of meteorological data, the drawing of weather charts, and the behaviour of clouds, in particular convective and lenticular clouds.

A variety of activities had been carried out, one being described thus in the report in *Weather* (*op.cit*. p.417):

> By arrangement with the Meteorological Officer at Leuchars, the British Isles surface chart for 06:00 hr was drawn up every Sunday morning. This, together with the midnight baratic and prebaratic charts from the Mufax, a tephigram of the latest ascents from Shanwell and either Lerwick or Aldergrove, and the local forecast, were collected and taken to the Gliding Club each Sunday morning, so that a forecast could be made for the Club members.[8]

Techniques to be used with balloons were investigated at Barry Ranges, Angus, and similar small investigations were carried out at Portmoak.

The meteorological activities carried out by Drs Rushforth and Pearce had revealed a great deal of interest in meteorology in the Gliding Club, so much so, in fact, that a more advanced meteorology course for glider pilots had been proposed. As reported in the *Weather* article (*op.cit*., p.417):

> It has been decided that the best way of getting results from the field studies would be to run a course on similar lines to those at other Field Study Centres. The course envisaged would consist of lectures and integrated field work directed towards the investigation of air flow in the vicinity of the local hills.

The article went on to say that the Gliding Club had a modern club house with good accommodation for residents on courses, and discussions had already taken place with the Club over the possibility of using the premises for such a course.

Meteorology and Gliding at Portmoak in 1962

A course on Meteorology and Gliding was indeed held at Portmoak in 1962. An advertisement for it was published in the February 1962 issue of *Weather* (**17**, 2, p.73) and a report on it by R P Pearce and J M Rushforth, the course directors, in the December 1962 issue (**17**, 12, p.404). According to the advertisement, the course would run from 15 to 22 September and cost £10 10s. 0d. including accommodation in the Scottish Gliding Union's Club Rooms or £3 3s. 0d. without accommodation. In the event, it ran from 16 to 22 September.

Pearce and Rushforth reported that thirteen students had taken part in the course, six of them forecasters from the Meteorological Office, the others members of the Scottish Gliding Union. The aim of the course had been, as Pearce and Rushforth put it, "the practical study of the airflow over the hills in the neighbourhood of the airfield, the results from this being of interest to both meteorologists and glider pilots". In fact, in order to give priority to such practical field observations, only four lectures had been given, and one of those was by the guest lecturer, Mr J Paton of the University of Edinburgh, who had spoken on 'Optical phenomena in the atmosphere'. Films and slides about clouds and gliding had been shown on two evenings.

During the first two days of the course, wind conditions had proved suitable for studying wave conditions in the lee of a local hill. In the words of Pearce and Rushforth, "balloons and gliders were tracked from theodolite stations, the gliders being equipped with aircraft thermometers, so that the temperature structure of the atmosphere could be examined".

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[8] The facsimile chart recorder known as 'Mufax' was manufactured by Muirhead & Co Ltd of Beckenham and introduced in the 1950s to receive meteorological charts and wire photographs by radio.

There were anticyclonic conditions during the latter part of the course, with very little wind. One whole day was spent plotting and working out results of field work, and this continued for part of the following day. After that, however, a thermometer was attached to the Tiger-Moth aircraft and an ascent made through the stratocumulus cloud to a height of 7,000 feet and temperature readings made every half-minute.

Pearce and Rushforth were in no doubt, and the students all concurred, that the course had been "successful in bringing together professional meteorologists and glider pilots, and that both parties had benefitted greatly by this union". Throughout the week, observations for plotting weather maps and tephigrams were supplied by the meteorological office at Pitreavie, and for this activity the six forecasters came into their own. Indeed, as Pearce and Rushforth reported, "the members of the Scottish Gliding Union were emphatic that the success of the course was due to the presence of the forecasters from the Meteorological Office".

A gratifying aspect of the course was that it attracted newspaper publicity in the *Daily Record* and the *Edinburgh Evening News*.

A meeting of instructors was held in 1964 at the Imperial College Field Station, Silwood Farm, near Ascot, to discuss methods of instruction for field courses. This picture shows members of the Royal Meteorological Society's Field Studies Committee engaged in a cloud physics demonstration, with Frank Ludlam (centre) creating a cloud, Wally Wallington (right) trying to make a mountain wave, and, standing observing (from left to right), John Green, Frank's son Hugo, John Hallett and Bob Pearce. Photograph kindly supplied by Ken Bignell.

PART 2
Many courses to choose from

INTRODUCTION

By the early 1960s, the basic principles of the Royal Meteorological Society's field courses had become established. Two types of course had emerged: those concerned specifically with the fundamentals of meteorology or oceanography, with particular emphasis on practical work; and those concerned with leisure activities such as gliding or bird-watching. Daily programmes for such courses had settled into patterns which were much the same from year to year. There is therefore little point in continuing to précis course reports published in *Weather*. That would be repetitious.

Pilot balloon practice on Mountain Weather course at Drapers' Field Centre, Betwys-y-Coed, 1970.
Photograph by D.J.George

Unfortunately, reports on field courses published in *Weather* became fewer and fewer in the 1970s and 1980s and dwindled to almost none by 1990, so it has proved impossible to provide any comprehensive information about course content from the 1960s onwards. In Parts 2 and 3 of this occasional paper, information about courses, such as it is known, is mostly presented in tabular and note form.

Part 2 of the paper takes the story of the Society's field courses from the early 1960s to the middle of the 1980s, during which time courses came and went but some, such as the Malham meteorology courses and the Weather and Bird Movement courses became annual fixtures. Throughout these years, as in the 1950s, field courses continued to be considered by the Society's Council important elements of the Society's educational provision, particularly for students and amateur members, whether members of the Society or not; and they were, indeed, an essential requirement of the Society's charitable status.

FINANCIAL ASPECTS

Most of this section on Financial Aspects has been taken verbatim from a Royal Meteorological Society typescript document headed 'Historical Notes. Courses in the Fifties and Sixties'. The document bears the date 16 April 1971 and was written by G R R Benwell, who was then the Society's Secretary II.[9]

Cost to the Society

It has not been easy to determine the actual cost to the Society of the field courses. In the financial statements with the annual reports of Council for the earlier years, items appear under the heading 'grants to the C.P.F.S. (Council for the Promotion of Field Studies)' and it might be deduced that this represented the total cost for that year. In fairness, it should be pointed out that in addition for each

[9] Secretary I was responsible for the Society's premises and general activities, Secretary II for the Society's scientific activities and Society meetings, including field courses.

of these years some element must be added for instructors' expenses (and small fees) and that furthermore the Scientific Activities Fund Committee records grants in connection with field studies for some of these years; such amounts were small.

For the second decade (the 1960s) it might be thought that it would be easier to deduce the cost, since the financial statements should record payments from the Carnegie United Kingdom Trust (in some form or other) or the nett cost to the Society of the field study courses if the Treasurer or Auditors should prefer to run a separate income/expense account for field studies, divorced from the main financial statement. However, in practice it was not found possible to extract these figures from the annual accounts for each year.

For 1960 and 1961, items appear in the financial statement showing 'sums due from the Carnegie United Kingdom Trust' – £463 for 1960 and £405 for 1961, suggesting an expenditure by the Society of at least £51 in 1960 and £45 in 1961.

1962 and 1963 cannot be so deduced, since no similar entries could be found in the accounts. The 1964 annual statement yields no useful information either, but the cost for that year is obtained from the 1965 report, since for that year onwards the 'nett cost of the field studies' appears as an item in the accounts with, for comparison, the amount for the previous year.

It seems odd that no entries in either income or expense in respect of the field study courses appear in the accounts for some years but, no doubt, there is a record. The Executive Secretary kindly provided figures for the years 1962-1967, but, for the years 1964-1967 these are not the same as those featuring in the accounts for these years.

Assistance from the Carnegie United Kingdom Trust

The annual amount which the Society could claim under the original arrangement was limited to a refund of the precise cost, previously approved in principle, of the courses for the year in question, provided this did not exceed £500. Later this was revised to a refund of up to 90% of the cost of the courses, up to a maximum of £500 in any one year.

This grant, on a quinquennial basis, has been renewed twice subsequently in 1965 and 1970. Attempts to get the ceiling raised to £600 for the current period failed, but, exceptionally, the Trust paid £576 in the final year of the second quinquennial (1970) as the Society had not claimed a full £500 in each of the preceding years.

Benefits to the Society

Against the expense to the Society of running these courses should be placed the non-financial benefit to the Society of the courses. It is unlikely that a source for recruiting members for the Society, known to represent about 15 members annually in the six years 1952-1957, should have proved sterile in subsequent years, though the practice of including such information in the annual reports ceased in 1958. Although the necessary information is not available, it seems reasonable to conclude that over the twenty years there has been some feedback into the Society's coffers from this source. If the 88 new members recruited in the years 1952-1957 have retained their interest this would represent a revenue of £528 for 1970. Though perhaps a little optimistic, this does not take into account any new members in other years.

It would therefore seem that it is surely one of the objectives of the Society to encourage and promote an interest in meteorology and the holding of these courses would appear to be an excellent way of trying to achieve such an objective.

Instructors

It should be placed on record that the ability to sustain such a programme of field studies is dependent upon obtaining an adequate supply of suitably qualified and dedicated instructors. The

Society has been fortunate in this respect, but it would probably help if the earlier arrangement existing in the Meteorological Office could be resurrected, namely the arrangement whereby staff so engaged could regard the necessary time spent on instructing on the courses as special leave with pay. Another aspect regarding instructors is the need to examine carefully the fees paid to them. The fees have recently been increased and the allowance for travel expenses has also been slightly increased. However, it is not much consolation to an instructor to learn that his fee has been increased when, as far as can be ascertained, under existing legislation, fees under £15 do not count for Income Tax while those in excess do so. When Council approved increased fees it was not contemplating handing the extra money to the Inland Revenue but to the instructors. Since on these occasions the instructor, especially if he is married, incurs additional expenditure which cannot easily be itemised, it is considered morally defensible to change the system to one in which only a small fee is paid to instructors, calculated to accord with their status, and to make a payment of travelling expenses as now determined plus a further lump sum to cover out-of-pocket expenses referred to earlier.

Up to the present, the cost to the Society, which is estimated at about £150 annually, is small compared to the benefit which the Society obtained from these courses.

End of verbatim section written by G R R Benwell.

ADMINISTRATIVE ARRANGEMENTS

The following has been taken verbatim from a memorandum sent to field course instructors in May 1977 by Dr James Milford of the University of Reading, then the Royal Meteorological Society's Secretary III.[10] Dr Milford had chaired the Society's Education Committee since its formation in 1974.

Introduction

This document summarizes the administrative arrangements which are normally made for the field courses when these are run at a Field Studies Centre belonging to the Field Studies Council or any other organization. Individual courses may vary in some particulars, but these guide lines are those used since the end of the Carnegie grant [which was last paid in 1975 and then withdrawn].

Planning

However the original idea arose, the substantive agreement is that between Chief Instructor and Warden of the Centre. They agree on topic, title and dates. The Society, through the Education Committee, should approve in principle before a new course is arranged, but a plan accepted as viable by Warden and Instructor will normally be supported.

Cancellation

Bookings go the Field Centre. The Instructor keeps himself informed of the state of bookings. If cancellation is necessary, this should be by mutual agreement between Warden and Instructor, but the final say is with the Warden, as the man in possession.

Publicity

The Field Studies Council and the Sports Council include courses in their own brochures. The Royal Meteorological Society advertises in *Weather* and prints pamphlets listing all courses sponsored by the Society. Pamphlets are distributed to a limited mailing list; suggested additions to this list are always welcome.

[10] From 1974, when the post was established, Secretary III was responsible for the Society's educational activities, including field studies. A Field Studies Committee had existed since 1964.

Chief Instructors are responsible for arranging special advertising for their own courses. Expenditure should be agreed in advance with Secretary III, to keep within the overall advertising budget. Personal contact is also a particularly profitable method of spreading information, and the Society has a display stand and a collection of suitable material for use at conferences, weekend meetings, etc., where possible customers may be gathered. This is available for loan on request.

Expenses

Normally, each course is run by two instructors. The Centre provides accommodation for both, and the honoraria and travel expenses of the two instructors are shared equally between Centre and Society. The cost of a third instructor (normally there to gain experience) may be met by the Society.

The Society also covers reasonable expenses in the form of consumables, film hire, etc. Each instructor can spend up to a maximum of £20 without reference to the Society, but above this amount authority of Secretary III must be obtained in advance.

Equipment

Instructors make their individual arrangements. The Society can help from its own stock of instruments, and also in some cases where it is desirable to borrow equipment from elsewhere, e.g. from universities or from the Meteorological Office.
For a list of the Society's own stock of instruments in November 1979, see Appendix 1.

Meteorology course at Malham Tarn, 1963
Left: Obtaining observations on a slope-traverse, using a hand anemometer.
Right: Reading sensitive anemometers placed near the Tarn at 9 inches, 1 metre and 2 metres above ground level.
Photographs by Berenice Pedgley, reproduced by kind permission.

Educational support

It is hoped to improve the educational support for the week-long courses (and shorter ones), by listing, for example, films, books, etc., and by stocking further films.

Feedback

Instructors are asked to report promptly after each course and to include a copy of the outline timetable. During the course, they should enquire where students saw the course advertised, as well as their background. They are also asked to collect visual material which may be useful for future exhibitions and advertising. They should also ask for reports from students suitable for submission to *Weather*.

End of verbatim section written by J R Milford.

RESOURCES

By the early 1960s, resources that were useful or even intended for field courses had begun to appear. Among the earliest were two books by Professor Richard Scorer which were, in fact, recommended in the advertisements for his 1963 and 1964 Weather and Bird Movement courses (Scorer, 1959; Scorer and Wexler, 1963). It would not be surprising if reference was also made to another of his books (Ludlam and Scorer, 1957) during the courses he directed.

Film strips and slides

In the early 1960s, the Royal Meteorological Society possessed in its Library at 49 Cromwell Road, South Kensington, London, many hundreds of lantern slides, all housed in boxes and fully catalogued, but it is very doubtful that many, if any, of them were suitable for use on field courses, such were their subjects (reproductions of diagrams published in the *Q.J.R.Met.S.* decades ago, weather and climatological charts dating back to the nineteenth century, pictures of famous meteorologists, historic instruments, photographs of severe weather events, etc).

The Society also possessed a superb collection of cloud and other meteorological photographs bequeathed by G A Clarke in 1949 (see Footnote 1) and C J P Cave in 1950 (known as the 'Clarke and Cave Collection'). Again, though, these photographs would not have been used on field courses, not least because many of them were in the form of prints or glass negatives. Some were, however, reproduced by Ludlam and Scorer (1957) in their book.

In early September 1984, Dick Ogden spent a full day at the Society's headquarters reviewing and listing in great detail the Society's entire collection of slides and glass negatives, including the Clarke and Cave Collection. In so doing, he was following up a preliminary review of the slides carried out by Stan Cornford in 1981. After 1984, the boxes of slides and negatives were kept in the Society's headquarters until 2007, when Malcolm Walker, with the permission of the Society's Council, deposited them in the National Meteorological Archive at Exeter.

During the first half of the 1960s, a set of transparencies was built up by the Society by reproducing photographs published in *Weather* since the middle of the 1950s. By 1966, there were 89 of these transparencies, some of them in colour. In all probability, the transparencies would have been useful on field courses, as most showed clouds or weather phenomena, but the extent to which they were actually used is not known. Instructors and visiting lecturers in the 1950s and early 1960s appear to have dipped into their own collections of slides.

A brief catalogue of meteorological films and film strips dated 1966 shows that the Society then possessed visual material which might well prove useful on field courses. Three films were listed:

1. Time-lapse pictures of the whole sky, coloured, two reels, 25 minutes.
2. Seeding the clouds (Schaefer), black and white.
3. Radar rain echoes (Bowen), black and white, with notes.

Eleven film strips were listed:

1. Clouds, Series A and B, coloured, with notes (Ludlam and Scorer).
2. Optical phenomena, ten slides, coloured, with notes (Scorer).

3. Storms, ten slides, coloured, with notes (Scorer).
4. Air pollution, Parts A and B, two reels, coloured, with notes (Scorer).
5. Drama of the Clouds, black and white (Daily Mail School-Aid Department).
6. Stable weather, causes and effects of inversions, coloured, with notes (Scorer).
7. Unstable weather, the growth of cumulonimbus, coloured, with notes (Scorer).
8. Running a school weather station:
   (a) Instruments and observations, with notes.
   (b) Field and laboratory experiments, with notes.
9. Meteorological instruments , with notes.
10. The Earth's atmosphere (Educational Productions Ltd), with notes.
    The Solar System (Educational Productions Ltd), with notes.
    Our weather (Educational Productions Ltd), with notes.
11. MA-4 Earth and Sky, 16mm coloured, written commentary (US satellite film).

It will be noted that Professor Scorer had produced several of the film strips. He was an enthusiastic advocate of meteorological field work and oversaw the Society's programme of field courses for several years.

Instruments

Over the years, the Royal Meteorological Society built up its own collection of meteorological instruments which could be borrowed from the Society for use on field courses. For a list of the instruments available in late 1979, see Appendix 1 (page 59).

Your Own Weather Map

In his report on the Weather and Flight course at Preston Montford in 1958, Edwards (1959) noted that one of the instructors, John Findlater, had explained "how much can be achieved by the amateur in chart drawing based only on an intelligent appreciation of the Official Shipping Forecasts and reports from coastal stations broadcast by the BBC". In the following year's Weather and Flight course at Preston Montford, Findlater again drew up synoptic and forecast charts from information contained in shipping forecasts broadcast by the BBC (Jones, 1959).

A new resource had been created and came to be much used on field courses (and, for that matter, by anyone who required an up-to-date synoptic chart and forecast for an outdoor activity). No longer was it necessary to try to gain (or even guess) some idea of the weather situation from meagre or otherwise inadequate press, radio or television reports, nor was it necessary to telephone a local meteorological station to obtain current weather information.

Wallington (1967) explained in articles published in *Weather* in 1964 and 1967 how to construct synoptic charts and forecasts from information provided by Shipping Bulletins broadcast by the BBC. To aid this task, a specially designed resource known as METMAP was published by authority of the Royal Meteorological Society. This was a double-sided form on which Shipping Bulletins could be taken down whilst they were being broadcast. Bulletins were broadcast at ordinary reading speeds, and, with practice and the help of a simple of system of abbreviations and shorthand, all of the relevant information could be taken down.

On one side of the METMAP (see the figures on pages 40 and 41), there was space for the general synopsis, and all sea areas were listed, as well as the stations for which coastal reports were provided.

Each broadcast began with gale warnings (if any), after which the general synopsis was read, giving the barometric pressure and frontal situation for the coming 24 hours. An example given by Wallington (1967), from the 06:45 Shipping Bulletin on 8 September 1963, read as follows:

> The general synopsis at midnight last night. A depression of 983 millibars which was positioned some 200 miles west of area Bailey is expected to move east and to be centred near the Faeroes with central pressure of 988 millibars by midnight tonight. A trough which extended from Orkney through the Irish Sea to north-west Finisterre is expected to move east to clear the North Sea by midnight tonight but farther south little movement is expected.

By using L for Low, T for Trough, W for Warm Front, E for eastward, etc, all the information could easily be taken down (though some people did tape-record the broadcast, just in case!). An **X** or a ✓ could be marked against each sea area for which there was a gale warning.

Forecasts for sea areas always started with Viking (between Norway and Shetland) and followed a more or less fixed sequence in a clockwise direction around the British Isles (see pages 40 and 41). Areas were combined when forecasts for them were similar, as in the example given by Wallington (1967) which was broadcast in the 06:45 Shipping Bulletin on 8 September 1963:

> Viking. Forties. Wind in east, at first south, force 5 or 6, otherwise south-west, force 4 gradually increasing to force 6 or 7. Periods of rain or showers. Mainly moderate visibility.

Viking and Forties could be bracketed together and suitable abbreviations used for wind and weather (e.g., SW4 → 6-7, R for rain, P for showers, D for drizzle, m for moderate visibility, g for good visibility, F for fog, Fp for fog patches, occ for occasional, cyc for cyclonic, etc).

Once the Shipping Bulletin had been taken down, it was time to plot, in pencil, the information on the side of the METMAP shown on page 41. The positions of Lows and Highs and their central pressures were plotted first, followed by information from coastal reports.[11]

Wind direction was typically shown by short straight lines which extended to station circles in the direction the wind was blowing. Wind force was normally shown by means of 'feathers', with a full feather indicating two steps of the Beaufort Scale, and a half feather showing one step, so that force 7, for example, would be denoted by 3½ feathers. Calm was shown by surrounding a station circle with a ring. Weather type and visibility were plotted to the left of the station circle, using symbols for weather such as ● for rain, ▽ for showers, ✱ for snow, and letters for visibility, such as m for moderate, g for good, p for poor. Barometric pressure was plotted above and immediately to the right of the station circle, using only the last two figures, so 1003mb, for example, would be plotted simply as 03. Pressure change was plotted just below the pressure value, with a short horizontal line denoting pressure steady, a short line sloping upwards to denote pressure rising, etc.

Once wind direction and force, weather types, visibility and pressure values had been plotted, the courses of isobars and the positions of troughs and ridges could be ascertained and a weather forecast constructed. For this, knowledge of weather systems needed to be applied. For example, if visibility was forecast to improve from moderate or poor to good, it may well have indicated a sea area initially in a warm sector but later behind a cold front, especially if there was a change of wind direction from, say, SW to W or NW. On field courses, there was considerable educational merit in discussing such clues with students in order to construct accurate forecast charts, and these forecasts could be of vital importance for activities which were particularly weather sensitive, such as sailing or hill walking.

Such was the success of *Your Own Weather Map* that Martin Stubbs (1983) revised and enlarged the booklet which had originally been published by Wallington in 1967, and METMAPs continued to be

[11] Occasionally, coastal stations were replaced, necessitating a reprint of the METMAPs. The version shown on page 40 was that published in 1986, by which time METMAPs were being published jointly by the Royal Meteorological Society and the Royal Yachting Association. By 1986, too, the number of sea areas had been increased with the addition of North Utsire and South Utsire, while Minches, which was listed in 1964, was no longer an official sea area by 1986.

much used into the 1990s. Today, however, most people obtain current meteorological information through electronic means such as the internet, especially through weather apps.

Books and articles

From the late 1950s onwards, books and articles which were useful or actually intended for field courses appeared in ever-greater numbers.

For Weather and Gliding courses, an article in *Weather* by Wallington (1959) on the use of gliders for exploring sea-breeze fronts was among the earliest to appear. Though not intended as a resource for field courses, it nevertheless showed how gliders could be used to investigate atmospheric behaviour, in this case sea-breeze fronts.

Another publication about weather and gliding that was useful on field courses though not specifically intended as a resource for them was the article on 'Weather for gliding over Britain' which was published in the May 1966 issue of *Weather*. In this, Wickham (1966) discussed the principal features of weather which are of importance for glider pilots, discussing in particular thermals, sea breezes, sea-breeze fronts, lee waves, and cloud-streets.

For Weather and Bird Movement courses, a book by Ken Williamson was a valuable resource on field courses (Williamson, 1965), though its title, *Fair Isle and its birds*, did not suggest any link between weather and bird movements. In fact, however, Williamson, the observatory's first director, had set out in his book the fundamentals of how the movements of migrating birds can be affected by day-to-day weather systems, with birds sometimes displaced involuntarily several hundreds or even thousands of miles from their intended courses when losing navigational cues under thick banks of cloud.

For a meteorological audience, Williamson (1969) set out in a paper published in the *Quarterly Journal of the Royal Meteorological Society* the fundamentals of how migratory birds use anticyclones and cols in spring and autumn, become disoriented in the fronts of depressions, and are sometimes carried all the way across the North Atlantic Ocean from west to east or from east to west when airstreams of an appropriate direction are persistently strong. He subsequently showed (Williamson 1975, 1976) how climatic change and variability can influence breeding distributions and populations and how inclement weather at a critical time for migration can sometimes compromise bird survival.

An example of the latter occurred in October 1973, when large numbers of migrating Swallows perished in unseasonable bitterly cold weather and snow-storms in central Europe. The number of Swallows in Britain the following year was only about 60% that of the number present in 1973. The effects of prolonged drought in the SAHEL zone of North Africa in the 1960s and thereafter on numbers of Whitethroats returning to the British Isles the following summer was all too evident in the reduction of numbers of this species recorded by the British Trust for Ornithology's Common Birds Census Scheme. The number of Whitethroats in Britain in 1969, for example, was only 20-30% that of the number recorded in 1968 and numbers subsequently did not recover (see Walker and Venables, 1990).

Whitethroat: a bird whose numbers in Britain depend upon climatic variability in the SAHEL region of North Africa (see adjacent text).

For courses on Mountain Weather, an article by Pedgley (1974) described the work carried out on such courses run by him and others in Snowdonia. He subsequently published (Pedgley, 1979) an essential guide to air motions and other aspects of the weather that might be encountered in the hills in the form of a book called *Mountain weather: a practical guide for hillwalkers and climbers in*

the British Isles. This book proved so successful that two further editions have been published (Pedgley, 1997, 2006). For another article about the work carried out on mountain weather courses, see George (1993).

Mountain Weather course, 1970: observing the weather on the summit of the Glyders. From Tolley (1971), p.36. Photograph by D J George.

For courses on Weather and Sailing, an article in *Weather* by Houghton (1969) provided considerable insight into the vagaries of air motions near the sea surface and related short-term and small-scale variations in the strength and direction of sea-surface currents. Though the article was concerned with winds over, and currents in, the warm waters off Acapulco in the autumn of 1967, ahead of the 1968 Mexico Olympic yachting events, it nevertheless proved useful for instructors and students on field courses on the colder waters close to the British Isles, for it showed that the behaviour of gusts and lulls and other air motions near the sea surface off the British Isles, though typically somewhat different from those observed off Mexico, were considerably more complicated than hitherto realised. Houghton subsequently published a number of books on weather and sailing which proved invaluable to yachtsmen, whether on field courses or not (see, for example, Houghton, 1986).

Weather and Sailing, Falmouth, 1966
Left: Sailing on a quieter day. From Tollafield (1967), p.31. Photograph by W H Reay.
Right: Double-skin balloons inflated for zero lift being used to study low-level wind flow. On this occasion, marked standing waves were observed downwind from the cliff in a wind of force 7. From the January 1967 issue of Weather, *p.29. Photograph by W H Reay.*

FIELD COURSES FROM THE EARLY 1960s ONWARDS

See Appendices 2 and 3.

These appendices provide information about instructors, visiting lecturers, collaborating organizations, costs of residence and tuition, and information about the courses published in *Weather*. Because of incomplete records, there are, unfortunately, many gaps.

METMAP SIDE 1 (used for taking down the Shipping Bulletin)

Both sides of Metmaps were printed in a mid-green colour.
They have been reproduced here in black and white for clarity.

R. MET. SOC./R.Y.A. METMAP (Revised Feb 1986)

GENERAL SYNOPSIS at .....GMT/BST.....

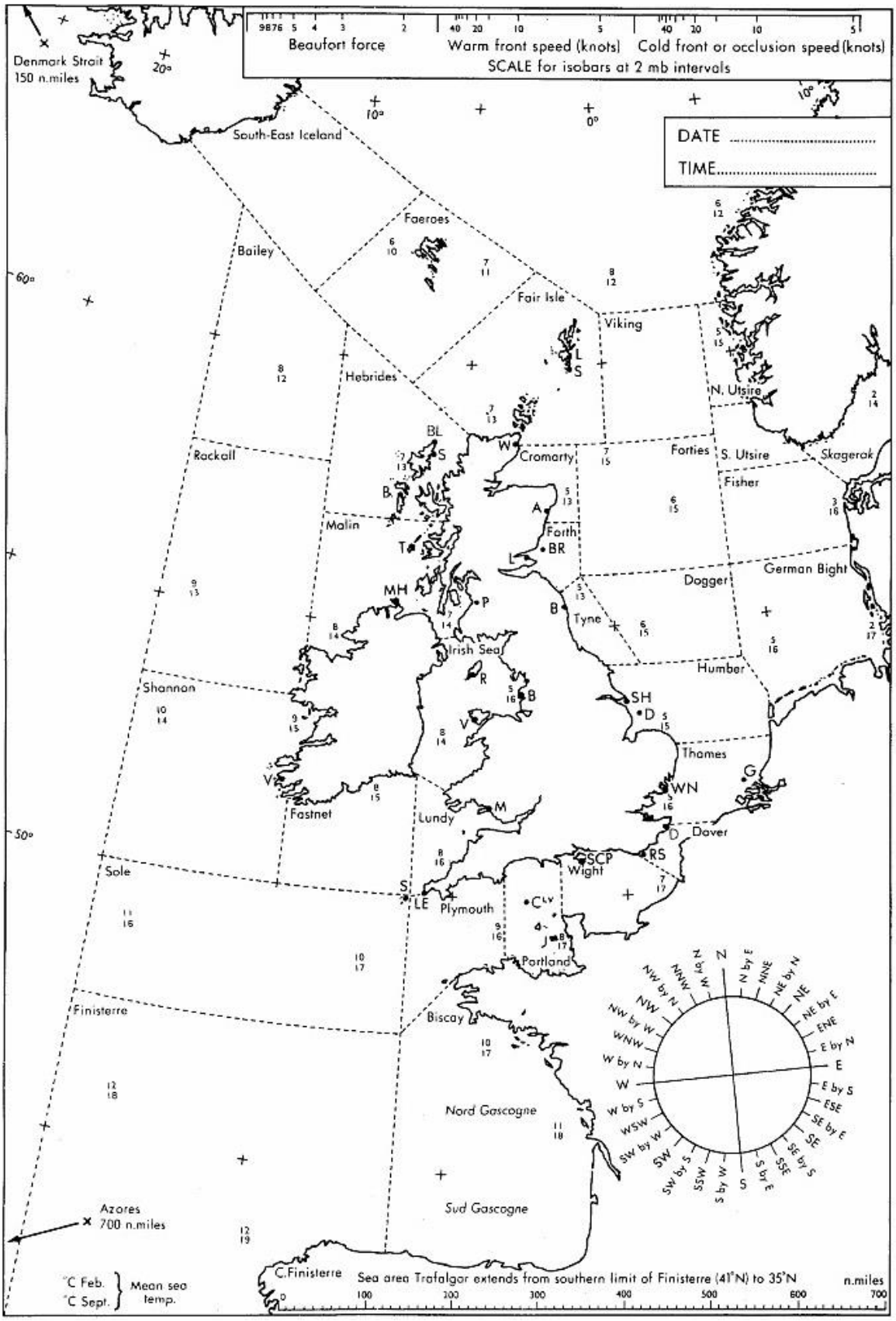
Gales	SEA AREA FORECAST	Wind	Weather	Visibility
	Viking			
	N. Utsire			
	S. Utsire			
	Forties			
	Cromarty			
	Forth			
	Tyne			
	Dogger			
	Fisher			
	German Bight			
	Humber			
	Thames			
	Dover			
	Wight			
	Portland			
	Plymouth			
	Biscay			
	Finisterre			
	Sole			
	Lundy			
	Fastnet			
	Irish Sea			
	Shannon			
	Rockall			
	Malin			
	Hebrides			
	Bailey			
	Fair Isle			
	Faeroes			
	SE Iceland			

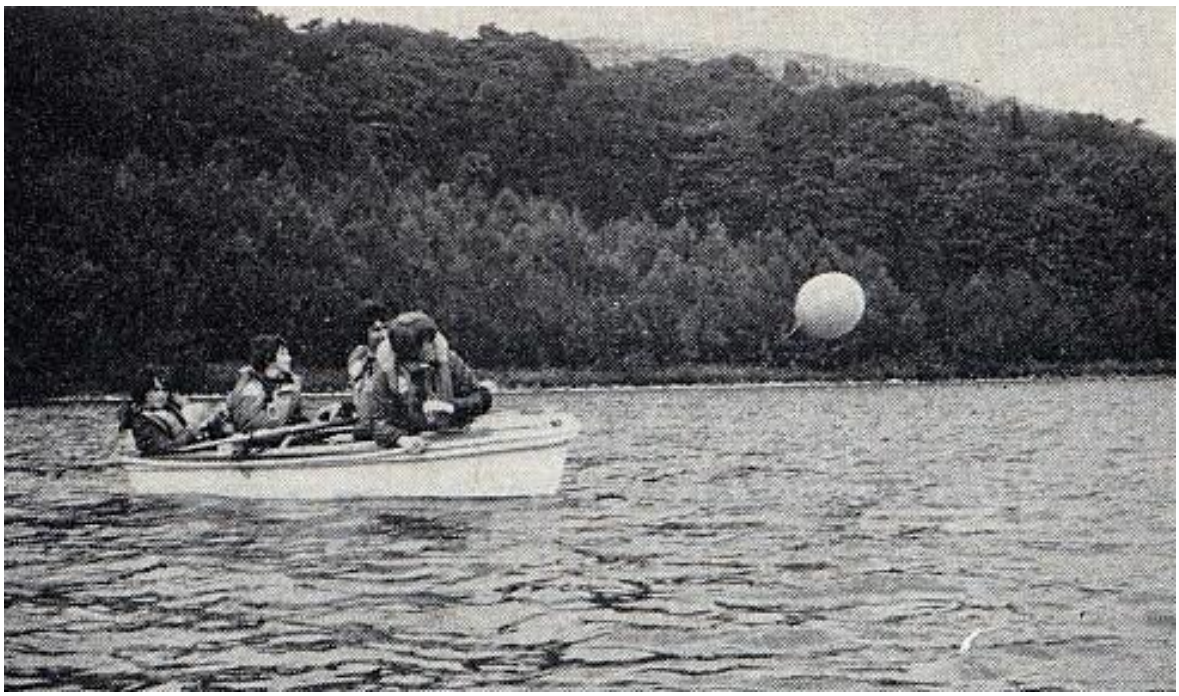
↑ Mark gale areas ↑ Connect areas grouped in forecast.

COASTAL REPORTS (Shipping Bulletin) at..... BST / GMT	Wind: Direction	Wind: Force	Weather	Visibility	Pressure	Trend
Tiree						
Butt of Lewis						
Sumburgh						
Bell Rock						
Dowsing						
Dover						
Royal Sovereign						
Channel L.V.						
Scilly						
Valentia						
Ronaldsway						
Malin Head						
Jersey						

COASTAL REPORTS (Inshore Waters) at..... BST / GMT	Wind: Direction	Wind: Force	Weather	Visibility	Pressure	Trend
Boulmer						
Spurn Head						
Walton on the Naze						
St. Catherine's Point						
Land's End						
Mumbles						
Valley						
Blackpool						
Prestwick						
Benbecula						
Stornoway						
Lerwick						
Wick						
Aberdeen						
Leuchars						

METMAP SIDE 2 (used for plotting the weather chart)





Above: Malham Tarn, 1976: Releasing a pilot balloon over the Tarn. From Towers (1976), p.429. Photograph by K D Towers.
Below: Preston Montford, 1975: Alan Gadian carrying out a mass-calibration of hand-made anemometers made out of squeezy bottles and ping-pong balls. The anemometers were later deployed over nearby hills and measurements taken at pre-arranged times throughout the day. Photograph kindly supplied by Ken Bignell.

PART 3
The closing years

INTRODUCTION

At the First International Conference on School and Popular Meteorological Education, held at Oxford in July 1984, Walker and Riddaway (1985) reviewed the Royal Meteorological Society's field courses. In so doing, their main purpose was to promote a form of education which was an essential part of the Society's educational provision and was, indeed, unique to the United Kingdom. However, concern was expressed in the review that the number of courses which had been cancelled over the previous decade or so for lack of support had been increasing.

Walker and Riddaway explained that the reasons for the lack of support had been discussed at Society committee meetings, with attention focused on advertising, but there were other factors, the major one almost certainly being cost, over which the Society had no control. As Appendix 2 shows, the costs of courses had increased steeply over the years, with, for example, the Meteorology course at Malham Tarn costing five guineas in 1950, £8 in 1962 and £114 in 1984. A package holiday for a week at a Mediterranean resort was now cheaper than most Society field courses; and many people now tended to regard a field course as a second holiday, not an educational opportunity. They attached a high priority to the family holiday and economised by staying away from field courses. And, moreover, if money was available, they probably did not feel inclined to spend a week getting wet and cold in the mountains of North Wales and sleeping in dormitory accommodation when for a comparable sum of money they could bask in the Mediterranean sun for a week and enjoy the comfort and convenience of their own apartment.

As Walker and Riddaway said, the comment about the weather in the mountains of North Wales was not inappropriate, because the mountain weather courses, which had once been popular, were no longer so attractive, and some had been cancelled in the early 1980s. And yet, as Walker and Riddaway pointed out, there were weather-related tragedies in the mountains of the British Isles every year, so weather awareness and understanding were clearly important. The reason why support for the mountain courses had declined was a mystery.

One course that continued to be well supported most years was Weather and Bird Movement, which Walker and Riddaway suggested could be that the number of bird-watchers in Britain was so large.[12] But, as they said, this was debatable. The numbers of hill-walkers, mountaineers and yachtsmen were also large. Perhaps, they suggested, there were many among the mountaineers and sailors who were complacent, believing themselves sufficiently expert on atmospheric behaviour. If so, their attitude was deplorable. Most yachtsmen, hill-walkers and mountaineers received very little formal tuition in meteorology, and some paid with their lives.

FIELD COURSE VIABILITY – CONCERN IN 1972

As early as 1972, the long-term viability of field courses had been questioned at a Royal Meteorological Society Council meeting. At the meeting on 21 June 1972, when discussing the report of the meeting of the Field Studies committee held on 10 May 1972, Council heard from Secretary II that the position of courses generally was an improvement on the previous year, forgetting, it seemed, that the cancellations in 1971 had resulted mainly from that year's prolonged postal strike. Nevertheless, as Secretary II noted, some 1972 courses might have to be cancelled for lack of

[12] The Royal Society for the Protection of Birds (RSPB) then had several hundred thousand members.

support, cases in point being 'Meteorology for Science Teachers' and 'Weather and Geography', both of which had attracted few students to date. Perhaps it was time, he suggested, that these courses were cancelled permanently and the introduction of new courses considered, such as one on the environment. Perhaps, he further suggested, "the Department of the Environment should be approached with a view of stressing the value of meteorology, that individual departments of schools should be contacted and that consideration should be given to the possibility of combining with other bodies". Council agreed.

When referring to cancellation of the 1972 Weather and Sailing course because the Falmouth Sailing Centre had been unable to confirm the booking (mentioned in Appendix 3), Secretary II suggested the possibility of moving the course to New Quay, West Wales. The course was indeed moved in 1973, but to the Isle of Wight, not New Quay.

At the Council meeting held on 18 October 1972, Secretary II reported that he had written to the Department of the Environment but received no reply to date, apart from an acknowledgement of his letter. He had also written to the Department of Education and Science to enquire if support for teachers to attend Society field courses might be sanctioned, the response being that he had been advised that local authorities could already give permission and authorise payment of expenses for such activities.

Later in the Council meeting on 18 October, when discussing the minutes of the Field Studies Committee meeting held on 4 October, Secretary II reported the feeling among instructors and members of the committee that "the Society ought to consider changing the manner in which field courses were run, in particular that lectures and week-end courses not necessarily in conjunction with the Field Studies Council be held".

Secretary II went on to point out that courses on which instructors had an international reputation, such as Weather and Bird Movement, Ken Williamson being the instructor in question, numbers of students were often limited by accommodation available. The number, for example, at Portland Bird Observatory, the home of Weather and Bird Movement in 1972, was only 11. Nearly three times that number had had to be turned away. Furthermore, with reference to lecturers and instructors of international standing, Secretary II suggested that it might be necessary to pay them considerably increased fees. Meanwhile, the Field Studies Committee had recommended to Council that the present lecture fee be increased from £7.50 to £10. Council agreed that the fee be so increased.

Apart from receiving a report on a meeting of field studies instructors held at the University of Reading on 11 November 1972 (mentioned in Appendix 3), Council did not discuss field studies again until 1974. There was no follow-up to the matters discussed on 18 October at the Council meeting on 20 December 1972 or thereafter. Council business throughout 1973 and into 1974 was dominated by plans for the Society's new purpose-built headquarters at Bracknell.

THE EDUCATION COMMITTEE RE-ESTABLISHED

There had been a Royal Meteorological Society Education Committee in the 1950s, but it had last met in 1956 and never then concerned itself with school and popular meteorological education. It had focused entirely on meteorology provision in British universities. The idea of forming a broadly-based education committee was put to Council on 18 October 1972 (see Walker, 1985) and the formation of such a committee was approved in principle by Council on 20 March 1974, formally on 15 May 1974. As mentioned on page 33, Dr James Milford of the University of Reading was appointed chairman and the committee first met on 9 October 1974.

According to the minutes of that meeting, the committee's Terms of Reference were "to formulate policies with regard to the advancement of the educational activities of the Society". Specifically excluded were the aspects of meteorological education which had been the fundamental interest of the Education Committee in the 1950s. In the words of the minutes, "the educational needs for

meteorological specialists were on the whole catered for by other committees – particularly the Meetings and Editing Committees; with regard to education at the level of professional meteorologists or tertiary education the Society would not be able to set any standards in this way unless it had a lever", which it then did not. The committee concluded that "the question of professional membership of the Society will have to be discussed", which, in the fullness of time, it was, the eventual outcome being, in 1994, the Society's Chartered Meteorologist accreditation. Rather, it was proposed, the remit of the newly-formed Education Committee would be to expand activities for amateurs, the general public and specialists in fields other than meteorology (e.g. civil engineering), especially through the Society's local centres.

Resources for schools and field courses

Surprisingly, neither the minutes of the first meeting of the Education Committee on 9 October nor the minutes of the Council meeting a week later made any specific reference to meteorological education in schools. This omission was, however, rectified at the next meeting of the Education Committee, held on 4 December 1974, when Dr Milford presented a development plan for the committee for the period 1975-1985 proposed by himself, Secretary I and Secretary II. In respect of meteorology in schools, the committee would "comment on the accuracy of available books, suitability of syllabuses, suggest projects and project material, and arrange courses for teachers". In addition, the committee "would build up information about existing teaching aids, build up and administer the Society's own stock, and, where appropriate, stimulate the publication or construction of new aids".

The Development Plan included provision "to administer field courses with the help of chief instructors" and "to maintain and despatch instruments and consumables for courses". There was no suggestion that field courses should be discontinued, nor was there for considerably more than a decade to come. Indeed, the pre-existing Field Studies Committee (see footnote 10) became the Field Studies Sub-Committee of the Education Committee, and this assumed responsibility for overseeing courses and reporting as required to the Education Committee.

By the time of the First International Conference on School and Popular Meteorological Education (July 1984), the profile of meteorological education in schools had risen considerably (see Walker, 1985). One-day workshops for school teachers had been organized, and the Society now retailed books, wall charts, maps and slides that were useful in secondary education. A review of meteorological films that could be used in secondary schools had been published in *Physics Education* in May 1980, and two exercises called *Satpack I and Satpack II* had been published by the Society, these concerned with the interpretation and understanding of satellite imagery in terms of surface data, upper-air ascents and synoptic analyses. All of these resources could be used not only in secondary schools but also on field courses, particularly courses concerned primarily with basic meteorology.

By the middle of the 1980s, as shown, for example, by the minutes of the Education Committee meeting held on 22 January 1986, attention had turned increasingly to provision for primary schools, while support for secondary schools had continued. Meanwhile support for field courses had also continued. The minutes in question noted that "there was a continuing need to purchase and maintain instruments used mainly by field study courses". The minutes also noted that "publicity arrangements for the 1986 courses had been completed".

For several years from the early 1980s to the early 1990s, a leaflet with an eye-catching design was used for advertising (see pages 46 and 47). This leaflet, which was distributed with *Weather*, was designed by students of Reading University's Typography Department and approved by the Society's Council on 18 February 1981.

THE 1987 FIELD COURSE LEAFLET

Royal Meteorological Society

Field Study Courses on Weather

The Royal Meteorological Society runs residential courses on various aspects of the weather every year and these usually include:

- Weather for Mountain activities
- Weather and Plant Ecology
- Mountain Weather
- Weather under Sail
- Understanding Weather
- Weather Science and Forecasting
- Weather and Bird Movement

For details of these courses please write to

Executive Secretary
Royal Meteorological Society
James Glaisher House
Grenville Place
Bracknell
Berkshire RG12 1BX

COURSES IN 1987

Weather Under Sail 16-23 May 1987 Fee £200

Directed by Mr Richard Ebling, Cardiff Weather Centre
Run in conjunction with the Island Cruising Club

Sailing from Salcombe in Devon the course takes place aboard the Club's 86ft classic Edwardian schooner which has berths for 8 plus Course Leader, Skipper and Mate, not forgetting a full-time cook. The destination will be the waters of the English Channel and you will learn not only about meteorology afloat but also about sailing a gaff rigged schooner, from measuring weather elements to influencing the ship's course on the basis of your forecast.

Mountain Weather 1-7 August 1987 Fee £131

Drapers' Field Centre, Betws-y-Coed, Gwynedd
Directed by Mr Terry Spalding and Mr Rodney Blackall, Meteorological Office

This is a course for all who like to roam in the hills. It consists of some lectures, do-it-yourself forecasting and field work amidst the beautiful scenery of Snowdonia.

Understanding Weather 7-14 August 1987 Fee £140

Malham Tarn Field Centre, Yorkshire
Directed by Dr Keith Weston, University of Edinburgh
and Dr David Warren, British Antarctic Survey

A course in which you are immersed in the weather and all things meteorological in the beautiful surroundings 1300ft up in the Yorkshire Dales. A full week's programme of talks, outdoor work and films includes learning about weather satellites, a forecasting competition and the launching and tracking of hydrogen-filled balloons.

Weather Science and Weather Forecasting 19-26 August 1987 Fee £138

The Leonard Wills Field Centre, Nettlecombe Court, Somerset
Directed by Dr Bob Riddaway, European Centre for Medium Range Weather Forecasts
and Dr Geoff Jenkins, Department of the Environment

Would you enjoy learning how to understand weather charts and make your own local forecast? — to track weather balloons, to measure high altitude winds? — and to be involved in lots of other weather activities, all in the informal atmosphere of a beautiful old country house in the Exmoor National Park? Then this is the course for you.

Weather and Bird Migration 6-11 September 1987 Fee £74.50

Gibraltar Point Field Station, Skegness, Lincolnshire
Directed by Mr Malcolm Walker, University of Wales Institute of Science and Technology
and Dr Al Venables, University College, Cardiff

A course for bird watchers who wish to study the ways in which bird migration, populations, flight patterns and breeding habits depend upon weather and climate. Talks will be informal and illustrated liberally with diagrams and slides. Part of each day will be spent in the field on the Gibraltar Point Nature Reserve.

Weekend Courses

Understanding Mountain Weather 6-7 June and 27-28 June 1987

Directed by Mr D. J. George, Meteorological Office, in conjunction with the Sports Council (No previous knowledge needed)

Weekend courses for those who go into the mountains for work or leisure, including leaders of parties and those working towards Mountain Leadership qualifications, Duke of Edinburgh awards, and 'O' Level Meteorology. Includes one field trip and informal lectures.

Bookings (including deposit of £25, deducted from course fee of £65) to: National Centre for Mountain Activities, Plas-y-Brenin, Capel Curig, Gwynedd.

For further details of the above courses please write, stating your specific interest, to:
The Executive Secretary, Royal Meteorological Society, James Glaisher House, Grenville Place, Bracknell, Berkshire RG12 1BX

Concern again over cancellation of field courses

At the Society's Council meeting held on 15 April 1981, concern was again expressed about cancellation of field courses. A Weather and Sailing course would take place that year but the Mountain Weather course had been cancelled; and it appeared that a field course called Under the Weather which involved instructors provided by the Society had been requested by the BBC's Education Department and arranged directly with a field centre without reference to the Society but then cancelled in a high-handed manner. As the minutes of the Council meeting on 17 June 1981 show, however, there had been a misunderstanding. Enquiries had shown that the course had, in fact, been cancelled by the Warden of the field centre in question and no complaint to the BBC was therefore necessary.

At their meeting on 21 October 1981, when considering the minutes of the meeting of the Field Studies Sub-Committee held on 30 September, Council heard that three of the 1981 field courses had been cancelled and that "the Sub-Committee was reviewing the style of courses to take advantage of any changes in popular demand". Council also heard at that meeting that the Education Committee had decided to abolish the Field Studies Sub-Committee and, instead, discuss matters concerning field studies at each year's autumn meeting of the Education Committee.[13]

Courses for gifted children

It was noted in the minutes of the meeting of the Field Studies Sub-Committee discussed by Council on 21 October that Dr J S A Green "had agreed to run a special course for the National Association for Gifted Children (Explorers Unlimited) but had stated that he would prefer the course to be open to all children in the age group concerned", not just 'gifted children'. The course was advertised on page 63 of the February 1982 issue of *Weather* (**37**, 2) and run by Dr Green at Packwood Haugh School, Shropshire, from 24 to 31 July 1982.

Also through the National Association for Gifted Children, Malcolm Walker ran the meteorological side of a course on meteorology and astronomy for children aged 8 to 10 at The Hill Education and Conference Centre, near Abergavenny, Monmouthshire. The course ran from 8 to 14 August 1982 and was timed to coincide with the annual display of the Perseids meteor shower, which did not disappoint on the last night of the course when the children were allowed to stay up until the early hours and cloudless skies allowed many meteors to be seen. Fourteen children took part in the course.

Field courses in the middle of the 1980s

Council heard at their meeting on 20 April 1983 that the course on Weather for Mountain Activities, scheduled for 20 April to 7 May might have to be cancelled as there were only three bookings. In the event, as Council heard on 15 June 1983, both of the 1983 courses on mountain weather had to be cancelled for lack of support and only one such course would be planned for 1984. In contrast, the 1983 course on Weather and Sailing had proved very successful. Another course which had not taken place in 1983, Council heard on 19 October 1983, was Weather and Plant Ecology, also through lack of support.

For 1984, Council agreed on 19 October, the mountain weather course would be renamed Weather in the Hills and various other week-long course offered, these being Weather under Sail (at the

[13] Formation of a Courses Sub-Committee was approved by Council on 20 February 1985 and the sub-committee was set up by the Education Committee on 22 January 1986, under the chairmanship of Ross Reynolds, its purpose being "to discuss new courses and submit proposals to the Education Committee". The sub-committee did not confine itself to field studies and, indeed, did not make many suggestions regarding such courses, ranging more widely to put forward ideas for a variety of educational courses, mostly of one-day duration. How long the sub-committee existed is not known, but it was still in existence in 1990.

Medina Valley Centre, Isle of Wight), Understanding Weather (at Malham Tarn), Weather Science and Forecasting (at Nettlecombe Court, Somerset), and Weather and Bird Movement (at Gibraltar Point, Lincolnshire). As Council heard on 17 October 1984, when considering the minutes of the Education Committee meeting held on 26 September, all of the 1984 field courses had taken place, except a weekend course on Understanding Mountain Weather, which had had to be cancelled because of the non-availability of the instructor.

For 1985, Council agreed at their meeting on 17 October 1984 that a full programme of week-long courses be offered, namely Weather in the Hills (at Betwys-y-Coed, directed by Terry Spalding), Climate and Plant Ecology (at Preston Montford, directed by Joan Wilson), Understanding Weather (at Malham Tarn, directed by Keith Weston), Weather Science and Forecasting (at Nettlecombe Court, directed by Geoff Jenkins and Bob Riddaway), and Weather and Bird Movement (at Gibraltar Point, directed by Malcolm Walker). There would also be a weekend course on Understanding Mountain Weather (at Plas-y-Brenin, directed by John George). It appeared that a week-long course called Weather Under Sail could not take place because the Medina Valley Centre had sold the yacht on which the course was held. However, the instructor, Mr Richard Ebling, would see if any alternative could be arranged, and, as stated in the Council minutes of 19 December 1984, was successful in this, securing the use of a Civil Service Yacht.

The Education Committee heard at their meeting on 22 January 1986 that a course planned at Nettlecombe Court for 28 to 31 December 1985 had not taken place owing to lack of support. They also heard from Geoff Jenkins, who was responsible for the Society's stock of instruments, that there was a continuing need to purchase and maintain instruments used mainly by field courses, and he agreed to update the list of instruments held by the Society. An implication of this was that there was then no intention of discontinuing the Society's programme of field courses in the near future. Indeed, the committee received at their meeting on 22 January a list of the week-long field courses planned for 1986, these being: courses on Weather under Sail (at Salcombe, run by Richard Ebling), Upper-Air Meteorology (at Edinburgh, run by Keith Weston and Charles Duncan), Understanding Weather (at Malham Tarn, run by Keith Weston and David Warren), Weather Science and Forecasting (at Nettlecombe Court, run by Geoff Jenkins and Bob Riddaway), and Weather and Bird Movement (at Gibraltar Point, run by Malcolm Walker). Also planned were weekend courses on Understanding Mountain Weather (at Plas-y-Brenin, run by John George) and Weather in the Hills (at Betwys-y-Coed, run by Terry Spalding and Rodney Blackall). For the time being, there appeared to be no threat to the continued provision of field courses.

On 15 October 1986, Council agreed to two items of expenditure which had been requested by the Education Committee at their meeting on 30 September: £200 for a one-day meeting of field studies instructors; and £50 for printing Certificates of Attendance for field course participants. And on 18 February 1987 Council agreed to a proposal from the Education Committee meeting on 28 January 1987 that grants of up to £50 *per* School Corporate Member for young people in the age range 15 to 18 to attend field study courses be made and that such grants be also made to teachers from these schools. The exact amount available to each School Corporate Member was clarified in a paper laid before the Education Committee on 22 September 1987: "any member of a school (teacher or pupil) will qualify for a reduction of £10 in the fees for the Society's field courses, and grants of up to £50 may be awarded to selected schools for teachers or pupils over 15 years old to attend these courses".

After early 1987, there was comparatively little mention of field courses in the minutes of Council for a couple of years. Council became preoccupied with the condition of James Glaisher House, the Society's purpose-built headquarters building in Bracknell, which culminated in the sale of the building and the move of the headquarters to Reading on 23 April 1990.

Meanwhile, as the minutes of Education Committee meetings show, programmes of field courses continued to be arranged each year, but fees were increasing steeply: Understanding Weather cost

£114 in 1984, £140 in 1987 and £180 in 1991, and Weather Science and Forecasting cost £115 in 1984, £138 in 1987 and £195 in 1991 (called Weather and Climate in 1991). Weather and Bird Movement did not cost as much (£65 in 1984, £74.50 in 1987 and £115 in 1990) but was subsidised by Nottingham University's Department of Adult Education.

APPOINTMENT OF AN EDUCATION OFFICER

A paper dated 26 April 1989 was put to the Education Committee on 17 May 1989. Written by Geoff Jenkins, who was then the Education Secretary, the paper argued for the employment of an Education Officer on the staff of the Society. The paper was subsequently considered by the Society's Development Committee on 24 May and approved by Council on 21 June 1989.

In his paper, Dr Jenkins noted that the need for an Education Officer had been "identified some years ago and a tentative approach made at a Development Committee meeting". At the time, however, the poor condition of the Society's headquarters building at Bracknell (severe water ingress and other problems) had only recently become fully appreciated and Council had become pre-occupied with deciding an appropriate course of action. By 1989, the sale of the building in Bracknell and the relocation of the headquarters to Reading in 1990 had been agreed by Council, and the financial state of the Society had once more become more secure.

Dr Jenkins envisaged the post of Education Officer being part-time, with an initial appointment of one year, subject to annual review. His view was that the person appointed would have a background in education, preferably with a science content, "but not necessarily involved in meteorology (although a healthy interest in the weather would be a distinct advantage)". He hoped that some of the costs of employing the Education Officer might be recovered through sales of materials developed, on a timescale of several years. In the paper presented to Council on 21 June, Dr Jenkins added that "the National Curriculum for Science was now a legal instrument, and that all schools had to include a study of weather in their curriculum from 5-16".

The post was advertised in the latter part of 1989 and the Society's Executive Secretary, Mr Ron Swash, advised the Education Committee at their meeting on 17 January 1990 that "recent advertisements had produced some 40 applicants, from which a short-list would be interviewed in February".[14] He went on to say that "teaching experience, preferably in science or geography, self-motivation, skill in co-ordinating the production of materials, and flexibility in working hours and a willingness to travel were seen as priorities by the Committee". The major initial task, said Mr Swash, was "reviewing the needs of the primary sector and the secondary sector and deciding on new Society projects". The new Education Officer took up her appointment on 29 May 1990.

There was little in the Job Description to suggest that the Society ran field courses. The list of the Education Committee's activities was a long one, including preparation for, and attendance at, educational conferences and exhibitions, producing new educational material, performing a feasibility study for a Young Meteorologists' Club, improving communication with schools (particularly through School Corporate Membership), and organizing an annual Sixth Form Lecture. There was only one heading which related directly to field studies: the Education Officer was responsible for arranging publicity for field courses, for providing material to be distributed at the courses, and for despatching any equipment required for them. There was also an indirect heading of relevance to field studies: the Education Officer was responsible for maintaining and administering loan and purchase arrangements for instruments.

[14] Dr Charles Duncan succeeded Dr Jenkins as Education Secretary in the autumn of 1989.

FIELD COURSE VIABILITY – THE 1990s

A report on field study courses prepared by the Education Committee was discussed in detail at the Society's Council meeting on 17 October 1990. The discussion included a consideration of future policy, in which it was stated that "declining numbers had been a concern for at least twenty years" and also that the Nottingham University Department of Adult Education "had suffered a decline of one-third in numbers on similar courses in 1990 compared with 1989". Moreover, the report said, the Field Studies Council were "very concerned at attendances in general – not only on Royal Meteorological Society courses.

Several questions were asked:

- The Society spent £1,600 on field courses in 1989. Was this money well spent?
- Were two instructors justified for student numbers of seven or eight or fewer?
- Was the population who wanted to attend field courses declining?
- Should hotel accommodation be used?[15]
- Should another centre, rather than Malham Tarn, be sought for the Understanding Weather course?

It was concluded that, despite the cancellations in 1990, a programme of courses should be arranged for 1991, and the committee was asked to review the situation at their meeting in May 1991.

Meanwhile, the future of the Society's field courses was discussed at a two-day meeting of the Royal Meteorological Society's Development Committee held on 12 and 13 April 1991, and it was recorded in the minutes that the Society had "agonised for 20 years" as to the viability of the courses. The use of "agonised" was probably an over-statement, but the meeting nevertheless concluded that "poorly attended courses should be scrapped and successful events maintained". "It was more", the minutes continued, "a question of the return on volunteer instructors' time than the expenditure".
Dr S J Harrison, Vice-President for Scotland, "advocated a rethink aimed at developing activity holidays".

As requested, the Education Committee considered field courses at their meeting on 2 May 1991 and decided to offer a programme of courses in 1992 similar to that of 1991. As regards running some courses with only one instructor, it was pointed out that "one pair of hands was not enough on some courses and that a late influx of bookings could then cause difficulty". The President of the Society, Professor Steve Thorpe, suggested that participants should be asked, as a routine, how they had heard of the course, and he also recommended that the full economic cost to the Society of running field courses should be further investigated. On some courses, in fact, it had been routine for many years to ask how participants had heard of the courses; and it would be surprising if the Society had not already hitherto taken the trouble to ascertain the full economic costs, including staff administrative costs at the Society's headquarters.[16]

Field courses were again discussed in detail at the meeting of the Education Committee held on 13 September 1991, and the commitment to run a programme of both existing and new courses in 1992 was not revoked. According to the minutes of the meeting, "committee members were asked to continue to make proposals for varying formats in association with other bodies, and no subsequent courses should be arranged until their plans for the target audience, financial arrangements and a viability criterion were approved by the committee". Somewhat ominously, the

[15] It was pointed out that Nottingham University were considering the use of hotels for their courses)

[16] The Society's expenditure estimates for 1985-1987, laid before Council on 17 December 1986, show £1,600 for 1985, £1,260 for 1986 and £1,409 for 1987. They also show field-course income of £536 in 1985, £113 for 1986 and £157 for 1987.

committee questioned whether or not field courses should be abandoned after 1992 but nevertheless "agreed to continue reviewing their effectiveness for educational value and in giving value for money spent". Direct costs on field courses in 1991 had been estimated at £2,030, which led to the inevitable question: were field courses making best use of Society funds?

At the meeting of the Education Committee on 15 January 1992, Malcolm Walker reported that the course on Weather and Bird Movement in September 1992 would go ahead in future with or without the Society, run entirely, if necessary, by the Nottingham University Department of Adult Education. In the event, this did not happen. The course continued to be run jointly by the Society and the University, with Malcolm's fee paid by the Society and the ornithological instructor's (Al Venables) by the University.

There was further discussion of field courses at the meeting of the Education Committee held on 13 May 1992, and, once again, no decision to abandon courses was taken. A programme of courses for 1993 was agreed, subject to cost reductions which were itemised in the papers that were circulated with the agenda (mainly instructors' fees and travelling expenses, but also gas for balloons for the course at Malham Tarn).

Increased publicity

Towards the end of the 1980s and in the early 1990s, efforts to publicise field courses were stepped up, at some considerable expense to the Society. Council agreed, for example on 17 October 1990 that the Society's field courses be advertised in the New Year 1991 issue of *Radio Times*. Despite generating about 300 enquiries, the advertisement had proved unsuccessful in attracting course participants, and the Education Committee decided on 13 September 1991 that this publication should not be used for advertising 1992 courses.

On 26 May 1993, the Education Committee noted that an advertisement for the field courses had been placed in the March 1993 issue of the *Geographical Journal* at a cost of £225, and agreed that an insert advertisement costing about £50 be placed in the January 1994 issue of *Teaching Earth Sciences*. Alas, it was reported at the meeting of the Education Committee on 6 October 1993 that the advertisement in the *Geographical Journal* had proved ineffective, as also had "a variety of advertising methods". For the 1994 courses, the Education Committee decided on 19 January 1994 that "the cost of advertising in the *Geographical Magazine* be ascertained", having been advised by geography teachers that this publication was more likely to be read in the school staffroom than the *Geographical Journal*. It was noted, too, that "other field courses had been featured in national newspapers, but there was no evidence of their attendance levels".

The last field courses

In early 1993, a two-part article about the manifold and wide-ranging educational activities of the Royal Meteorological Society was published in *Weather* (Walker, 1993a and 1993b). In this article, the value of field courses was stressed, and Walker (1993b) stated that the Society intended "to find a means for them to continue in the foreseeable future". Within a few years, however, his optimism would be dashed. His promotion of the courses in the article did not bear fruit. The future for the Society's field courses was not promising.

Programmes of courses for 1994 and 1995 were agreed by the Education Committee, but there was considerable doubt as to whether or not numbers would be sufficient for courses to run. It was recorded in the minutes of the Education Committee meeting held on 28 September 1994 that committee members had been asked "to consider the viability of field courses for discussion at the next meeting". The programme for 1994 was published in the January 1994 issue of *Weather* (**49**, 1, p.36-37), from which it could be anticipated that consumer price resistance was likely to be a major factor in determining the viability of courses. The cost of Understanding Weather (Malham Tarn)

was, for example, advertised as £220 per person, Weather and Climate (Nettlecombe) £150, and the two sailing courses well over £300 each. In the event, the latter two courses did not run.

Even as late as the opening months of 1995, there was an understandable reluctance to cease offering field courses after more than four decades, for, after all, the courses had been one of the Society's success stories. However, the decision to cease offering them was eventually taken by the Education Committee at their meeting on 17 May 1995, the minutes recording that "1995 courses should take their chance, but the Royal Meteorological Society would not mount a field studies course programme in 1996". The reasons listed in the minutes were as follows:

- For thirty years, attendances had been declining and the Education Committee had many times given thought and effort to remedies;
- Some of the other field centre courses attract better numbers, but all the signs were that there was no future for traditional Royal Meteorological Society field study courses.
- Royal Meteorological Society expenditure had been considerably reduced in retrospect as a consequence, rather than a contributory cause of, the decline.

Council approved the recommendation of the Education Committee.

This brought to an end the chapter on the Society's involvement with field courses.

Nettlecombe Court, Somerset, home of the Weather and Climate course. Photograph courtesy of Geoff Jenkins.

The photograph shows the two instructors, either side of the theodolite, with Bob Riddaway (behind, left) and Geoff Jenkins (to the right).

Footnote: a field course abroad

The 1995 Weather and Bird Movement course was held at Gibraltar, southern Europe, where participants were able to enjoy ornithological spectacles not available to them at Gibraltar Point, Lincolnshire. They were able, for example, to watch at close quarters from the café on the top of the Rock of Gibraltar how soaring birds exploited thermals when migrating from Europe to North Africa and how birds adapted for gliding used the lift provided by up-currents off the vertical east face of the Rock. In organizing this course, the University of Nottingham chose to base a course in an hotel rather than a field centre, something they had first suggested in the late 1980s.[17] Even though the course cost as much as £630, including fees, accommodation and air fare, there were ten participants.

[17] At its meeting on 27 January 1993, the Education Committee rejected the idea of using hotels. It was recorded in the minutes that "using hotel venues was considered but the Committee concluded that Field Studies Centres were preferable for Royal Meteorological Society courses".

ACKNOWLEDGEMENTS

I am very grateful to Berenice and David Pedgley, Geoff Jenkins and Ken Bignell for supplying photographs. I am also very grateful to Sylvia Oliver for copy editing this paper and to Howard Oliver for his comments on the paper.

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APPENDIX 1

METEOROLOGICAL INSTRUMENTS HELD BY THE ROYAL METEOROLOGICAL SOCIETY IN NOVEMBER 1979

1 TEMPERATURE AND HUMIDITY COMBINED

Ten Casella whirling psychrometers (leather case) – eight with humidity slide rule.
Four Casella older type whirling psychrometers (leather case) – two with slide rule.
Eight spare thermometers for whirling psychrometers in a foam case.
One Casella clockwork aspirated psychrometer with thermometers ranging from -15°C to +40°C.
One spare thermometer for the aspirated psychrometer.
Many wicks for whirling psychrometers.

2 TEMPERATURE

Three Short & Mason soil thermometers (5cm).
Two 4 inch immersion thermometers.
Two full immersion thermometers.
One minimum thermometer -30°F to +90°F.
One Short & Mason minimum thermometer -35°C to +40°C.
One magnet for a Six's thermometer.
One Short & Mason thermograph 45°C range.
One Grant temperature recorder -5°C to +35°C – nine channel with 5.4 volt battery.
150 24-hour charts for Short & Mason thermograph 0°F to 100°F.
50 Met Form 5867 range -10°C to +35°C.
One Short & Mason minimum thermometer Met Ref 669 100°F type.
One thermograph (unknown type) range 45°C.
One spare weekly clock and drum.
50 Met Form 5869 range from -25°C to +20°C.
50 Met Form 5870 range from -10°C to +35°C.
Four miniature screens to go with mast.

3 HUMIDITY

One humidity slide rule Mk6 Met Ref 2200 with Casella slide rule leaflet.
52 hygrograph charts.
One Bilham humidity slide rule leaflet.
One hair hygrograph by Jules Richard (1908).

4 RAINFALL

Three 5 inch Snowdon pattern rain-gauges.
Eleven measuring flasks 5 inch Met Ref 145
One Negretti & Zambra 8 inch gauge measure BRO 10196/53 No.1116.
One Dines natural syphon rain-gauge.
Many 5mm charts for natural syphon rain-gauge.
Many 0.4 inch charts for natural syphon rain-gauge.
Ten rain-gauge funnels.

5 WIND

23 hand-held ventimeters (Elvometer Co. Sweden).
50 pilot balloons 30g type Met Ref 29011 (possibly perished).
Three geostrophic scales.
50 pilot balloons 10g type.
15 elastic brackets for ventimeters (both types).
Two anemometers and pair of 2m poles.
One 21 foot mast in three sections with supporting guys.
One electrically indicating air-meter 12025.
Ten ventimeters – second series (with built-in compass).
One thermistor anemometer.

6 SUNSHINE

One Campbell-Stokes sunshine recorder.
A quantity of summer sunshine cards.
Two Lintronic solarimeters.
One stand for solarimeters.

7 PRESSURE

One Short & Mason barograph presented to the Royal Meteorological Society in 1921.
Two aneroid altimeters and barometers (portable).
Two mercury barometers.

8 ACCESSORIES

Two stop watches (1/5th second) Waltham Pattern No.3.
Three prismatic marching compasses.
One Salter balance 0-100 grams.
One centre zero moving coil meter model / 909.
One Stanley meteorologist's rule.
One chart recorder ink bottle.
Three geostrophic scales.
One box of special matches.
Spare wire.
One Bartholomew's 1:10,000,000 map of British Isles.
Seven carrying boxes for equipment with keys.
One large carrying box (double size).
Two miniature mains operated chart recorders (Amprobe).
Charts for above.

9 STATIONERY

Pamphlet of Chartwell graph paper types.
Two bottles of Indian ink.
Two balls of string.
One reel of Sellotape.
A quantity of foolscap paper.

Stationery continued on next page

Coloured paper.

Inspector's kit.

Set of red pens. Various sizes and types of graph paper.

A quantity of tephigrams.

Plasticine.

Four screwdrivers.

10 BOOKS

One copy of the *Observer's Handbook* (Second Edition, 1956).

11 INSTRUMENT INSTRUCTIONS

One copy 'Use of Grant Temperature Recorder'.

One copy of 'Use and calibration of thermistor anemometer'.

Pilot balloon work, Malham Tarn, 1963. Photograph by Berenice Pedgley, reproduced by kind permission.

Nettlecombe, 1970:
Left: John Green (standing) instructing students how to measure solar radiation.
Right: Ken Bignell (left) and John Green relaxing with a dog.
Photographs kindly supplied by Ken Bignell.

APPENDIX 2

FIELD COURSES FROM THE EARLY 1960s ONWARDS

In alphabetical order

AIR POLLUTION AND METEOROLOGY
in Cardiff in 1973 and 1974

For an article about these two courses and the research carried out on them, see Cox (1977), published in the February 1977 issue of *Weather*, **32**, 2, pp.42-56.

MATHEMATICS AND PHYSICS IN THE FIELD
in 1962, 1963 and 1964 at Dale Fort Field Centre, Pembrokeshire

Dates of courses:	**Collaborating organizations:**	**Residence and tuition:**
1962: 5-12 September	Field Studies Council	£8 10s. 0d.
1963: 17-24 April	Field Studies Council	£9
1964: 1-8 April	Field Studies Council	£9
1964: 2-9 September	Field Studies Council	£9

Instructors:
1962: Mr J B Rigg and Mr P B Foley
1963: Mr P B Foley
1964: (April) Mr P B Foley and Mr P J Andrews
1964: (Sept) R H A Stewart (Nautical College, Pangbourne) and Dr J S A Green (Imperial College)

Information in *Weather*:
1962: February (**17**, 2, pp.71-72) and December (**17**, 12, pp.402-403) – see McGonigle, B.F. (1962)
1963: January (**18**, 1, pp.26-27 and December (**18**, 12, p.373) – see Foley, B. (1963)
1964: January (**19**, 1, p.25). No report was published in *Weather* but the course does appear to have taken place (see *Q.J.R.Met.S.*, 1965, **91**, 389, p.386).
1964: January (**19**, 1, pp.23-24) and December (**19**, 12, p.387) – Creer, M. (1964)

MATHEMATICS AND PHYSICS IN/OF THE OPEN AIR
in 1963 at Preston Montford Field Centre (Shropshire)
from 1966 to 1968 at Dale Fort Field Centre (Pembrokeshire)
from 1969 to 1975 at Nettlecombe Court Field Centre (Somerset)

Dates of courses:	**Collaborating organizations:**	**Residence and tuition:**
1963: 10-17 April	Field Studies Council	£9
1963: 4-11 September	Field Studies Council	£9
1966: 31 August to 7 September	Field Studies Council	£10-10s. 0d.
1967: 9-16 September	Field Studies Council	
1968: 24-31 July	Field Studies Council	£11 10s 0d.
1970: 29 July to 5 August	Field Studies Council	£14 10s 0d.
1971: 28 July to 4 August	Field Studies Council	
1972: 26 July to 2 August	Field Studies Council	

1973: 25 July to 1 August	Field Studies Council
1975: 23-30 July	Field Studies Council

Instructors:

1963:Dr G B Tucker (Meteorological Office) and Dr J L Monteith (Rothamsted Experimental Station)
1963: R H A Stewart (Nautical College, Pangbourne)
1966: Dr J S A Green and Dr K J Bignell (both of Imperial College)
1967: Dr J S A Green and Dr K J Bignell (both of Imperial College)
1968: Dr J S A Green and Dr K J Bignell (both of Imperial College)
1969: Dr J S A Green and Dr K J Bignell (both of Imperial College)
1970: Dr J S A Green and Dr K J Bignell (both of Imperial College)
1971: Dr K J Bignell and Dr K J Weston (both of Imperial College)
1973: Dr J S A Green and Dr K J Bignell (both of Imperial College)
1975: Dr K J Bignell and Alan Gadian (both of Imperial College)

Information in *Weather*:

1963: January (**18**, 1, p.26), August (**18**, 8, p248) and December (**18**, 12, p.373) – see Spray, C. and Boyce, D. (1963) and Tucker, G.B. and Monteith, J.L. (1963)
1963: January (**18**, 1, p.27) and December (**18**, 12, pp.373-374)
1966: January (**21**, 1, p.30) and January 1967 (**22**, 1, p.30) – see Harker, A.H. (1967)
1967: January 1968 (**23**, 1, p.42) – see Luther R. (1968)
1968: Leaflet distributed with *Weather*. Report in *Weather* January 1969 (**24**, 1, p.35) – see Humphrey and Price (1968)
1970: Leaflet distributed with *Weather*. Report in *Weather* January 1971 (**26**, 1, pp.34-35) – see Collie and Simpson (1971)
1971: Report in *Weather* December 1971 (**26**, 12, p.547) – see Deakin and Wheldon (1971)
1972: Report in *Weather* January 1973 (**28**, 1, pp.39-40) – see Prichard and Tomalin (1973)
1973: Report in *Weather* January 1974 (**29**, 1, p.38) – see Love and Lawrence (1974)
1975: Announcements in both January and February 1975 issues of *Weather* (**30**, 1 and 2).

METEOROLOGY (AT MALHAM TARN) called UNDERSTANDING WEATHER from 1977 from 1950 at Malham Tarn (Yorkshire)

For several years in the 1970s and 1980s and again in 1992, after a gap of a few years, members of the Rugby Weather Bureau attended these courses at Malham Tarn (see, for example, Towers 1976, Wadmore 1980, Hamilton Smith 1985, and Talbot 1993). They were school students, some as young as 13, all from a climatological station based in Rugby, Warwickshire.

Dates of courses:	**Collaborating organizations:**	**Residence and tuition:**
1962: 5-12 September	Field Studies Council	£8
1963: 4-11 September	Field Studies Council	£9
1964: 2-9 September	Field Studies Council	£9
1965: 1-8 September	Field Studies Council	£9
1966: 31 August – 7 September	Field Studies Council	£10 10s. 0d.
1968: 4-11 September	Field Studies Council	£11 10s. 0d.
1969: 3-10 September	Field Studies Council	
1970: 2-9 September	Field Studies Council	£14 10s. 0d.
1972: 6-13 September	Field Studies Council	
1975: 3-10 September	Field Studies Council	
1976: 1-8 September	Field Studies Council	
1977: 30 August – 7 September	Field Studies Council	

1978: 16-23 August	Field Studies Council	
1979: 15-22 August	Field Studies Council	
1980: 13-20 August	Field Studies Council	
1981: 19-26 August	Field Studies Council	
1984: 17-24 August	Field Studies Council	£114
1986: 8-15 August	Field Studies Council	
1987: 7-14 August	Field Studies Council	£140
1988: 5-12 August	Field Studies Council	
1989: 4-11 August	Field Studies Council	
1990: 3-10 August	Field Studies Council	
1991: 2-9 August	Field Studies Council	£180
1992: 31 July – 7 August	Field Studies Council	£199
1993: 30 July – 5 August	Field Studies Council	
1994: 29 July – 5 August	Field Studies Council	£220
1995: 28 July – 4 August		£230

Instructors:

1962: D H McIntosh (University of Edinburgh) and J M Bayliss (Meteorological Office Training School)
1963: D H McIntosh (University of Edinburgh) and J M Bayliss (Meteorological Office Training School)
1964: D H McIntosh (University of Edinburgh)
1965: D H McIntosh (University of Edinburgh) and J M Bayliss (Meteorological Office Training School)
1966: D H McIntosh (University of Edinburgh) and J M Bayliss (Meteorological Office Training School)
1968: Mr D W S Limbert (Meteorological Office) and Dr A Thom (University of Edinburgh)
1970: Dr A S Thom (University of Edinburgh) and Mr I H Chuter (Napier College of Science and Technology)
1975: Dr A S Thom and Dr C N Duncan (both University of Edinburgh)
1976: Dr Keith Weston and Dr Charles Duncan (both University of Edinburgh)
1977: Dr Keith Weston (University of Edinburgh) and Dr J Curran (Heriot-Watt University, Edinburgh)
1978: Dr Keith Weston and Mr Tom Miles (both University of Edinburgh)
1979: Dr Keith Weston and Mr David Warren (both University of Edinburgh)
1980: Dr Keith Weston and Mr David Warren (both University of Edinburgh)
1981: Dr Charles Duncan and Mr David Warren (both University of Edinburgh)
1984: Dr Keith Weston and Mr David Warren (both University of Edinburgh)
1987: Dr Keith Weston and Mr David Warren (both University of Edinburgh)
1991: Dr Keith Weston (University of Edinburgh) and Mr David Warren (Ramtek Ltd)
1992: Dr Keith Weston (University of Edinburgh) and Dr David Warren (Ramtek Ltd)
1993: Dr David Warren (Ramtek Ltd)
1994: Dr David Warren (Ramtek Ltd)
1995: Dr David Warren (Ramtek Ltd)

Visiting lecturers:

1962: Dr J M Rushforth (Queen's College, Dundee)
1963: Mr J S Sawyer (Meteorological Office)
1964: Mr E Knighting (Meteorological Office)
1965: Professor Gordon Manley (University of Lancaster)
1966: Dr R J Murgatroyd (Meteorological Office)
1975: Dr J F R McIlveen (University of Lancaster)

Information in *Weather*:

1962: February (**17**, 2, pp.72-73) and December (**17**, 12, pp.401-402) – see Turner, D.W. (1962)
1963: January (**18**, 1, p.27) and December (**18**, 12, p.374) – see Shaw, B. (1963)
1964: January (**19**, 1, p.24) and December (**19**, 12, pp.387-388) – see Gover, J. (1964)
1965: January (**20**, 1, p.29) and December (**20**, 12, pp.387-388) – see H.W.L. (1965)

1966: January (**21**, 1, pp.30-31) and January 1967 (**22**, 1, pp.29-20) – see Price, B.P. (1967)
1968: Advance information in leaflet in *Weather*. Report in *Weather* January 1969 (**24**, 1, p.36) – see Littlewood, W. (1969)
1969: January 1970 (**25**, 1, p.42) – see Hartwell, S. (1970)
1970: Advance information in leaflet in *Weather*.
1972: Announcement December 1971 (**26**, 12, frontispiece).
1975: Announcements in both January and February 1975 issues of *Weather* (**30**, 1 and 2, both in announcements section of the magazine). Report in *Weather* in April 1976 (**31**, 4, pp.129-131) – see Postle and Davis (1976)
1976: Report in the December 1976 issue of *Weather* (**31**, 12, pp.429-430) – see Towers (1976).
1977: Report in the March 1978 issue of *Weather* (**33**, 3, pp.110-111) – see Sherry (1978)
1978: Report in the February 1979 issue of *Weather* (**34**, 2, pp.77-78) – see Pay (1979)
1979: Report in the April 1980 issue of *Weather*, (**35**, 4, pp.120-121) – see Wadmore (1980)
1980: Report in the March 1981 issue of *Weather*, (**36**, 3, p.87) – see Pecksen (1981)
1981: Report in the June 1982 issue of *Weather*, (**37**, 6, p.179) – see Benham (1982)
1984: Report in the April 1985 issue of *Weather*, (**40**, 4, p.126) – see Hamilton Smith (1985)
1992: Report in the March 1993 issue of *Weather*, (**48**, 3, p.96) – see Talbot (1993)

METEOROLOGY AND GLIDING
from 1957 to 1964 at various centres in England* and Scotland**
* from 1957 to 1960 at Preston Montford Field Centre (Shropshire) from 1960 courses at Lasham (Hampshire), the Long Mynd (Shropshire), Dunstable (Bedfordshire), and also an unnamed venue in Devon.
** Portmoak (Kinross)

The cessation of these courses in 1965 with no subsequent resumption appears to have been linked with the departure of Mr C E Wallington for a job in Australia.

Dates of courses:	**Collaborating organizations:**	**Residence and tuition**:
1962: October	British Gliding Union (at Lasham)	
1964: 12-19 October	Scottish Gliding Union, Portmoak	£10-10s. 0d.

Instructor:
1962: Names of instructors not known
1964: Names of instructors not known

Visiting lecturers:
1964: J K MacKenzie and J Paton

Information in *Weather*:
1962: March (**17**, 3, p.105)
1964: January (**19**, 1, p.26)

METEOROLOGY FOR SCIENCE TEACHERS
1972 at The Leonard Wills Field Centre, Nettlecombe Court, Somerset

Dates of course:	**Collaborating organizations:**	**Residence and tuition:**
1972: 9-16 August	Field Studies Council	

Information in *Weather*:
1972: Announcement December 1971 (**26**, 12, frontispiece).

MOUNTAIN WEATHER
called WEATHER IN THE HILLS in 1984
from 1970 to 1982 at various centres
from 1970 at Drapers' Field Centre, Betwys-y-Coed, North Wales

Dates of course:	Collaborating organizations:	Residence and tuition:
1970: 26 August – 2 September	Field Studies Council	£14 10s. 0d.
1971: 21-28 August	Field Studies Council	
1972: 16-23 August	Field Studies Council	
1973: 15-22 August	Field Studies Council	
1974: 31 July – 7 August	Field Studies Council	
1975: 23-30 July	Field Studies Council	
1976: 4-11 August	Field Studies Council	
1984: 4-10 August	Field Studies Council	£105
1987: 1-7 August	Field Studies Council	£131
1989: 13-18 August	Field Studies Council	
1990: **Course cancelled – only one person booked**		
1994: 2-3 April and 26-27 November	Field Studies Council	each £115

Instructors:

1970: Mr D E Pedgley (Anti-Locust Research Centre) and Mr D J George (Meteorological Office)
1971: Mr D E Pedgley (Anti-Locust Research Centre), Mr D J George (Meteorological Office) and Mr P B Wright (Climatic Research Unit, University of East Anglia)
1973: Mr D E Pedgley (Anti-Locust Research Centre), Mr D J George (Meteorological Office) and Mr T R Spalding (Meteorological Office)
1974: Mr D E Pedgley (Anti-Locust Research Centre), Mr D J George (Meteorological Office) and Mr T R Spalding (Meteorological Office)
1975: Mr D E Pedgley (Anti-Locust Research Centre), Mr D J George (Meteorological Office) and Mr T R Spalding (Meteorological Office)
1976: Mr D J George, Mr T R Spalding and Mr R M Blackall (all Meteorological Office)
1984: Rodney Blackall and Terry Spalding (both Meteorological Office)
1987: Rodney Blackall and Terry Spalding (both Meteorological Office)
1994: Terry Spalding (Meteorological Office)

Information in *Weather*:

1970: Advance information in separate leaflet distributed with *Weather*. Report in *Weather* January 1971 (**26**, 1, pp.35-36) – see Tolley, H. (1971)
1971: Report in *Weather* December 1971 (**26**, 12, pp.545-546) – see Pike, W. (1971)
1972: Announcement December 1971 (**26**, 12, frontispiece).
1973: Report in *Weather* January 1974 (**29**, 1, pp.39-40) – see Bright, W.J. (1974) and Pedgley, D.E. (1974)
1974: Report in *Weather* January 1975 (**30**, 1, p.29) – see Fleck, D.J. (1975)
1975: Announcements in both January and February 1975 issues of *Weather* (**30**, 1 and 2, both in announcements section of the magazine). Report in *Weather*, February 1976 (**31**, 2, p.66) – see Imrie, D. (1976)
1976: Report in the March 1977 issue of *Weather* (**32**, 3, pp.108-109) – see Heasman (1977)
1984: Report in the June 1985 issue of *Weather* (**40**, 6, pp.184-185) – see Dunning and Wright (1985) – see also Spalding (1985)

For an article about weather and mountain activities, see George (1993).

OCEANOGRAPHY
at Dale Fort Field Centre (Pembrokeshire) from 1959 to 1962

Dates of course:	Collaborating organizations:	Residence and tuition:
1962: 22-29 August	Field Studies Council	£8-10s. 0d.

Instructor:
1962: R H A Stewart (Nautical College, Pangbourne)

Information in *Weather*:
1962: February (**17**, 2, p.71) and December (**17**, 12, p.401) – see Stewart, R.H.A. (1962)

OUTWARD BOUND COURSE
at the Sea School, Aberdovey (Mid Wales) in 1966

THE PHYSICS OF SUN, WIND AND WATER
from 1964 to 1967 at Preston Montford Field Centre (Shropshire)

Dates of course:	Collaborating organizations:	Residence and tuition:
1964: 8-15 April	Field Studies Council	£9
1965: 7-14 April	Field Studies Council	£9
1966: 6-13 April	Field Studies Council	£10-10s. 0d.

Instructors:
1964: Dr G B Tucker (Meteorological Office) and Dr J L Monteith (Rothamsted Experimental Station)
1965: Dr G B Tucker (Meteorological Office) and Dr J L Monteith (Rothamsted Experimental Station)
1966: Mr D W S Limbert (Meteorological Office) and Dr K J Bignell (Imperial College)

Information in *Weather*:
1964: January (**19**, 1, p.23) and July (**19**, 7, p.221) – Gadd, A.J. (1964)
1965: January (**20**, 1, p.28) and December (**20**, 12, p.387) – see P.H. (1965)
1966: January (**21**, 1, p.29)

UNDERSTANDING MOUNTAIN WEATHER
see WEATHER FOR MOUNTAINEERS

WADERS AND THE WEATHER
called BIRD-WATCHING AROUND MORECAMBE BAY in 1990
Weekend courses at the Castle Head Field Centre, Grange-over-Sands

Dates of courses:	Collaborating organizations:	Residence and tuition:
1989: 5-8 May	University of Nottingham	£88
1990: 11-14 May	University of Nottingham	

Instructors:
1989: Malcolm Walker and Dr Al Venables (both Cardiff University)
1990: Malcolm Walker and Dr Al Venables (both Cardiff University)

WEATHER AND BIRD MOVEMENT
at Dale Fort Field Centre (Pembrokeshire) from 1960 to 1970
at Portland Bird Observatory (Dorset) from 1972 to 1974
at Gibraltar Point Field Station (Lincolnshire) from 1975 to 1994
at Gibraltar (southern Europe) in 1995
called WEATHER AND BIRD MIGRATION from 1987

Dates of courses:	**Collaborating organizations:**	**Residence and tuition:**
1962: 19-25 September	Field Studies Council	£8-10s. 0d.
1963: 18-25 September	Field Studies Council	£8-10s. 0d.
1964: 16-23 September	Field Studies Council	£9
1965: 15-22 September	Field Studies Council	£9
1966: 14-21 September	Field Studies Council	£10 10s. 0d.
1968: 18-25 September	Field Studies Council	£11 10s. 0d
1969: 17-24 September	Field Studies Council	
1970: 16-23 September	Field Studies Council	£14 10s. 0d
1971: **Course cancelled because of a prolonged postal strike at a key time of year for bookings.**		
1972: 13-20 September	Portland Bird Observatory	
1973:12-19 September	Portland Bird Observatory	
1974:11-18 September	Portland Bird Observatory	
1975: 12-19 September	Gibraltar Point Bird Observatory	£21
1976: 11-19 September	Gibraltar Point Bird Observatory	
1977: 10-17 September	Gibraltar Point Bird Observatory	
1978: **Course did not take place – insufficient bookings**		
1979: 8-14 September	University of Nottingham	
1980: 6-12 September	University of Nottingham	
1981: 12-18 September	University of Nottingham	£50.50
1982: 11-17 September	University of Nottingham	
1983: 10-16 September	University of Nottingham[18]	£61
1984: 8-14 September	University of Nottingham[19]	£65
1985: 7-13 September	University of Nottingham	
1986: **Course did not take place – insufficient bookings**		
1987: 6-11 September	University of Nottingham	£74.50
1988: 11-16 September	University of Nottingham	£95
1989: 10-15 September	University of Nottingham	£105
1990: 9-14 September	University of Nottingham	£115
1992: 6-11 September	University of Nottingham	
1993: 4-9 September	University of Nottingham	
1994: 10-17 September	University of Nottingham	
1995: 9-16 September	University of Nottingham	£630, incl. Gibraltar hotel

Instructors:
1962: Professor R S Scorer (Imperial College) and Kenneth Williamson (British Trust for Ornithology)
1963: Professor R S Scorer (Imperial College) and Kenneth Williamson (British Trust for Ornithology)
1964: Professor R S Scorer (Imperial College) and Kenneth Williamson (British Trust for Ornithology)
1965: Professor R S Scorer (Imperial College) and Kenneth Williamson (British Trust for Ornithology)

[18] In 1984 and 1985 in association also with the Lincolnshire and South Humberside Trust for Nature Conservation.

[19] Department of Adult Education.

1966: Ken Williamson (British Trust for Ornithology) and Mr S G Cornford (Meteorological Office)
1967: Ken Williamson (British Trust for Ornithology), Stan Cornford (Meteorological Office) and Malcolm Walker (UWIST, Cardiff)[20]
1968: David Glue (British Trust for Ornithology) and Malcolm Walker (UWIST, Cardiff)
1969: David Glue (British Trust for Ornithology), Stan Cornford (Meteorological Office) and Malcolm Walker (UWIST, Cardiff)
1970: David Glue (British Trust for Ornithology) and Malcolm Walker (UWIST, Cardiff)
1971: Course cancelled because of a prolonged national postal strike at a time when bookings were normally made.
1972: Kenneth Williamson (British Trust for Ornithology) and Malcolm Walker (UWIST, Cardiff)
1973: Frank Clafton (Portland Bird Observatory Warden), Kenneth Williamson (British Trust for Ornithology) and Malcolm Walker (UWIST, Cardiff)
1974: Frank Clafton (Portland Bird Observatory Warden), Kenneth Williamson (British Trust for Ornithology) and Malcolm Walker (UWIST, Cardiff)
1975: Malcolm Walker (UWIST, Cardiff), assisted by George Evans and Barry Wilkinson (both of Gibraltar Point Field Centre)
1976: Malcolm Walker (UWIST, Cardiff), assisted by George Evans and Barry Wilkinson (both of Gibraltar Point Field Centre)
1977: Malcolm Walker (UWIST, Cardiff), assisted by Dick Lambert (Gibraltar Point Field Centre). Visiting lecturer: Dr Bernard Stonehouse (University of Bradford)
1979: Malcolm Walker (UWIST, Cardiff) and Dr Al Venables (University College, Cardiff)
1980: Malcolm Walker (UWIST, Cardiff) and Dr Al Venables (University College, Cardiff)
1981: Malcolm Walker (UWIST, Cardiff) and Dr Al Venables (University College, Cardiff)
1982: Malcolm Walker (UWIST, Cardiff) and Dr Al Venables (University College, Cardiff)
1983: Malcolm Walker (UWIST, Cardiff) and Dr Al Venables (University College, Cardiff)
1984: Malcolm Walker (UWIST, Cardiff) and Dr Al Venables (University College, Cardiff)
1985: Malcolm Walker (UWIST, Cardiff) and Dr Al Venables (University College, Cardiff)
1986: **Course did not run – instructors not available**
1987: Malcolm Walker (UWIST, Cardiff) and Dr Al Venables (University College, Cardiff)
1988: Malcolm Walker and Dr Al Venables (both Cardiff University)
1989: Malcolm Walker and Dr Al Venables (both Cardiff University)
1990: Malcolm Walker and Dr Al Venables (both Cardiff University)
1991: **Course did not run – instructors not available**
1992: Malcolm Walker and Dr Al Venables (both Cardiff University)
1993: Malcolm Walker and Dr Al Venables (both Cardiff University)
1994: Malcolm Walker and Dr Al Venables (both Cardiff University)
1995: Malcolm Walker and Dr Al Venables (both Cardiff University)

Information in *Weather*:

1962: February (**17**, 2, p.72) and December (**17**, 12, p.405) – see Arkell, J. (1962)
1963: January (**18**, 1, pp.27-28)
1964: January (**19**, 1, p.25) and December (**19**, 12, p.388) – see Bateman, P. (1964)
1965: January (**20**, 1, pp.29-30) and December (**20**, 12, p.389) – see Butterworth, N.H. (1965)
1966: January (**21**, 1, p.31)
1968: Advance information in separate leaflet distributed with *Weather*. Report in *Weather* January 1969 (**24**, 1, p.37) – see Kerrish, E. (1969)
1969: January 1970 (**25**, 1, pp.42-43) – see Stemmler, A. (1970)
1970: Advance information in separate leaflet distributed with *Weather*. Report in *Weather* January 1971 (**26**, 1, pp.36-37) – see Loughridge, J. (1971)

[20] UWIST = University of Wales Institute of Science and Technology. UWIST merged with University College, Cardiff, in 1988 to form Cardiff University.

1972: Announcement December 1971 (**26**, 12, frontispiece).
1975: Announcements in both January and February 1975 issues of *Weather* (**30**, 1 and 2, both in announcements section of the magazine).
1984: Report in the February 1985 issue of *Weather*, (**40**, 2, pp.54-55) – see Lam (1985).

For an article about weather and bird migration, see Walker and Venables (1990).

WEATHER AND CLIMATE
see WEATHER SCIENCE AND FORECASTING

WEATHER AND GEOGRAPHY
at Preston Montford Field Centre (Shropshire) in 1967, 1969 and 1970

There was no course in 1968 because of an outbreak of Foot and Mouth disease.

Dates of courses:	Collaborating organizations:	Residence and tuition:
1967: 29 March to 5 April	Field Studies Council	Not known
1968: 3-10 April	Field Studies Council	£11 10s. 0d.
1969: 9-16 April	Field Studies Council	
1970: 8-15 April	Field Studies Council	£14 10s. 0d.

Instructors:
1967: Not known
1968: Mr D M Houghton (Meteorological Office) and Dr J G Lockwood (University of Leeds)
1969: Mr D E Pedgley (Anti-Locust Research Centre) and Mr J A Kington (Swansea University College)
1970: Mr D E Pedgley (Anti-Locust Research Centre) and Mr J A Kington (Swansea University College)

Information in *Weather*:
1967: January 1968 (**23**, 1, p.41) – see Measures, G.A. (1968)
1968: Advance information in separate leaflet distributed with *Weather*.
1968 course cancelled because of an outbreak of Foot and Mouth disease.
1969: Report in *Weather* March 1970 (**25**, 3, p.132) – see Hardy, P. (1970)
1970: Advance information in separate leaflet distributed with *Weather*.

WEATHER AND MATHEMATICS
at Dale Fort Field Centre (Pembrokeshire) from 1967 to 1970

Dates of course:	Collaborating organizations:	Residence and tuition:
1968: 28 August – 4 September	Field Studies Council	£11 10s. 0d.
1970: 26 August – 2 September	Field Studies Council	£14 10s. 0d.

Instructors:
1968: Mr F H Bushby (Meteorological Office) and Dr R S Harwood (Imperial College)
1970: Dr R S Harwood (Clarendon Laboratory, Oxford) and P D Borrett (Meteorological Office)

Information in *Weather*:
1968: Advance information in separate leaflet distributed with *Weather*.
1970: Advance information in separate leaflet distributed with *Weather*.

WEATHER AND PHOTOGRAPHY
at Nettlecombe Court Field Centre (Somerset) in 1976

Dates of course:	Collaborating organizations:	Residence and tuition:
1976: 21-28 July	Field Studies Council	

Instructor:
1976: Dr K J Bignell (Imperial College)

Information in *Weather*:
1976: Report in the February 1977 issue of *Weather*, (**32**, 2, pp.72-73) – see Davies (1977)

WEATHER AND PLANT ECOLOGY
occasional from 1966 to 1981 at Preston Montford Field Centre (Shropshire) called CLIMATE AND ECOLOGY IN 1966 AND 1978

There was no course in 1968 because of an outbreak of Foot and Mouth disease.

Dates of course:	Collaborating organizations:	Residence and tuition:
1966: 6-13 July	Field Studies Council	£10-10s. 0d.
1968: 10-17 July	Field Studies Council	£11-10s. 0d.
1970: 8-15 July	Field Studies Council	£14-10s. 0d.
1972: 12-19 July	Field Studies Council	
1978: 1-8 September	Field Studies Council	

Instructors:
1966: Professor C D Pigott (University of Lancaster) and Dr J L Monteith (Rothamsted Experimental Station)
1968: Professor C D Pigott (University of Lancaster) and Dr J L Monteith (Rothamsted Experimental Station)
1970: Professor J L Monteith (University of Nottingham) and Joan Wilson (University of Lancaster)
1972: Professor J L Monteith (University of Nottingham) and Joan Wilson (University of Lancaster)
1978: Dr Joan Wilson (University of Lancaster) and Dr Mike Unsworth (University of Nottingham)

Information in *Weather*:
1966: January (**21**, 1, pp.29-30)
1968: Advance information in separate leaflet distributed with *Weather*. **Course cancelled (see above).**
1970: Advance information in separate leaflet distributed with *Weather*.
1972: Announcement December 1971 (**26**, 12, frontispiece). Report in *Weather* January 1973 (**28**, 1, pp.38-39) – see Hussey, C. (1973)
1978: Report in *Weather* June 1979 (**34**, 6, pp.243-244) – see Love (1979)

WEATHER AND SAILING
annually from 1962 to 1981
initially at Falmouth Sailing Centre (Cornwall), from 1962, later at Dodnor Creek (near Cowes, Isle of Wight) and Surbiton (SW London)

Dates of courses:	Collaborating organizations:	Residence and tuition:
1962: 8-15 September	Falmouth Sailing Centre Ltd	Approx. £15
1963: 7-14 September	Falmouth Sailing Centre Ltd	Approx. £15
1964: 5-12 September	Falmouth Sailing Centre Ltd	15 guineas
1965: 11-18 September	Falmouth Sailing Centre Ltd	16 guineas

1966: 10-17 September	Falmouth Sailing Centre Ltd	17 guineas
1967: 9-16 September	Falmouth Sailing Centre Ltd	Not known
1968: 7-14 September	Falmouth Sailing Centre Ltd	18½ guineas
1970: 5-12 September	Falmouth Sailing Centre Ltd	19 guineas
1975: 14-22 June	National Sailing Centre, Cowes	

Instructors:
1962: D M Houghton and C E Wallington (both Meteorological Office)
1963: D M Houghton and C E Wallington (both Meteorological Office)
1964: D M Houghton and C E Wallington (both Meteorological Office)
1965: D M Houghton and C E Wallington (both Meteorological Office)
1966: D M Houghton and Dr N E Rider (both Meteorological Office)
1967: D M Houghton and Dr N E Rider (both Meteorological Office)
1968: D M Houghton and Dr N E Rider (both Meteorological Office)
1970: Mr M J Blackwell and Mr F Singleton (both Meteorological Office)

Information in *Weather*:
1962: February (**17**, 2, p.73) and December (**17**, 12, p.403) – see Lonsdale, K. (1962)
1963: January (**18**, 1, p.28) and December (**18**, 12, pp.375-376)
1964: January (**19**, 1, pp.25-26) and December (**19**, 12, pp.388-389) – see Gibb, J.A.C. (1964)
1965: January (**20**, 1, pp.30-31) and December (**20**, 12, p.388) – see Frets, F.W. (1965)
1966: January (**21**, 1, pp.31-32) and January 1967 (**22**, 1, pp.31-32) – see Tollafield, T.A. (1967)
1967: January 1968 (**23**, 1, pp.42-43) – see Holford, I. (1968)
1968: Advance information in separate leaflet distributed with *Weather*. Report in *Weather* January 1969 (**24**, 1, pp.36-37) – see Dale, G.N. (1969)
1970: Advance information in separate leaflet distributed with *Weather*.
1975: Announcements in both January and February 1975 issues of *Weather* (**30**, 1 and 2, both in announcements section of the magazine).

WEATHER CRUISE
from 1968 to 1970 and 1985 to 1995 on the English Channel out of the Island Sailing Club, Salcombe (Devon)
called WEATHER UNDER SAIL from 1984 to 1995 (out of the Medina Valley Centre, Isle of Wight, from 1982 to 1984)

Dates of course:	**Collaborating organizations:**	**Residence and tuition:**
1968: 8-15 June	Island Cruising Club	
1984: 2-9 June	Island Sailing Club	£185
1995: 9-16 September	Island Cruising Club	£350 approx

Instructors:
1984: Mr Graham Parker (London Weather Centre)
1995: Someone from the BBC Weather Centre

Information in *Weather*:
1968: January 1959 (**24**, 1, pp.34-35) – see Angliss, D. (1969)

WEATHER FOR MOUNTAINEERS
held at the National Centre for Mountain Activities, Plas-y-Brenin, Snowdonia called UNDERSTANDING MOUNTAIN WEATHER from 1986 to 1992

Dates of course:	Collaborating organizations:	Residence and tuition:
1978: 1-8 April	Sports Council	
1979: 21-28 April	Sports Council	
1986: 3-4 May and 25-26 October	Sports Council	
1987: 6-7 June and 27-28 June	Sports Council	
1988: 4-5 June and 25-26 June	Sports Council	
1989: 25-26 June	Sports Council	
1990: 23-24 June and 13-14 October	Sports Council	
1991: 22-23 June and 12-13 October	Sports Council	
1992: 4-5 April	Ty'r Morwydd Advanced Field Study Centre, Abergavenny	

Instructors:
1978: Mr D J George (Meteorological Office)
1979: Mr D J George (Meteorological Office)
1986: Mr D J George (Meteorological Office)
1987: Mr D J George (Meteorological Office)
1988: Mr D J George (Meteorological Office)
1989: Mr D J George (Meteorological Office)
1990: Mr D J George (Meteorological Office)
1991: Mr D J George (Meteorological Office)
1992: Mr D J George (Meteorological Office)

Information in *Weather*:
1978: Report in the January 1979 issue of *Weather* (**34**, 1, pp.37-38) – see Williams (1979)
1979: Report in the May 1980 issue of *Weather* (**35**, 5, pp.147-148) – see Anon (1980)
1986: Report in the March 1987 issue of *Weather* (**42**, 3, pp.86 and 88) – see George (1987)
1992: Report in the September 1992 issue of *Weather* (**47**, 9, pp.369-370) – see Ray (1992)

For an article about weather and mountain activities, see George (1993).

WEATHER SCIENCE AND FORECASTING
from 1972 at Nettlecombe Court Field Centre (Somerset) called Weather and Climate from 1991

Dates of course	Collaborating organizations	Residence and tuition
1975: 13-20 August	Field Studies Council	
1984: 22-29 August	Field Studies Council	£115
1986: 20-27 August	Field Studies Council	
1987: 19-26 August	Field Studies Council	£138
1988: 24-31 August	Field Studies Council	
1989: 23-30 August	Field Studies Council	
1990: **Course cancelled – only two people booked**		
1991: 21-28 August	Field Studies Council	£195
1994: 24-31 August	Field Studies Council	£220
1995: 30 August – 6 September		£220

Instructors:
1984: Geoff Jenkins (Meteorological Office) and Bob Riddaway (ECMWF)
1986: Geoff Jenkins (Meteorological Office) and Bob Riddaway (ECMWF)

1987: Geoff Jenkins (Meteorological Office) and Bob Riddaway (ECMWF)
1988: Geoff Jenkins (Meteorological Office) and Bob Riddaway (ECMWF)
1989: Geoff Jenkins (Meteorological Office) and Bob Riddaway (ECMWF)
1991: Geoff Jenkins and Bob Riddaway (both Meteorological Office)
1994: Geoff Jenkins and Bob Riddaway (both Meteorological Office)
1995: Geoff Jenkins and Bob Riddaway (both Meteorological Office)

Information in *Weather*:
1975: Announcements in both January and February 1975 issues of *Weather* (**30**, 1 and 2, both in the announcements section of the magazine).

WEATHER UNDER SAIL
from 1982 to 1991 on the English Channel
out of the Medina Valley Centre, Isle of Wight, 1984
out of the Island Sailing Centre, Salcombe, thereafter

Dates of course	Collaborating organizations	Residence and tuition
1984: 2-9 June	Medina Valley Centre	£185
1986: 17-24 May	Island Cruising Club	
1987: 16-23 May and 12-19 September	Island Cruising Club	£200
1988: No course		
1989: 6-13 May and 2-9 September	Island Cruising Club	
1990: 6-13 May and 2-9 September	Island Cruising Club	
1991: 4-11 May	Island Cruising Club	£300 approx
1994: 14-21 May	Island Cruising Club	£330
1994: 10-17 September	Island Cruising Club	£350

Instructors:

1984: Mr Graham Parker (London Weather Centre)
1986: Mr Richard Ebling
1987: Mr Richard Ebling (then Cardiff Weather Centre)
1989: Mr Richard Ebling
1990: Mr Richard Ebling
1991: Mr Richard Ebling (then Southampton Weather Centre)
1994: 14-21 May – Peter Cockcroft (BBC Weather Centre)
1994: 10-17 September – Penny Tranter (BBC Weather Centre)

Information:
See Walker and Riddaway (1985), p.103.

APPENDIX 3

SUMMARY OF FIELD COURSE VENUES

YEAR	NO. OF COURSES	COURSES AND VENUES (numbers of students in brackets)
1950	1	Meteorology (Malham Tarn, Yorkshire) (43)
1951	2	Meteorology (Malham Tarn, Yorkshire) (not known) Meteorology (Juniper Hall, Surrey) (about 15)
1952	1	Meteorology (Malham Tarn, Yorkshire) (26)
1953	1	Meteorology (Malham Tarn, Yorkshire) (26)
1954	1	Meteorology (Malham Tarn, Yorkshire) (40)
1955	2	Meteorology (Malham Tarn, Yorkshire) (35) Meteorology (Juniper Hall, Surrey) (32)
1956	2	Meteorology (Malham Tarn, Yorkshire) (27) Meteorology (Flatford Mill, Suffolk) (not known)
1957	3	Meteorology (Malham Tarn, Yorkshire) (25) Meteorology (Flatford Mill, Suffolk) (not known) Weather and Flight (Preston Montford, Shropshire) (not known)
1958	3	Meteorology (Malham Tarn, Yorkshire) (25) Meteorology (Preston Montford, Shropshire) (not known) Weather and Flight (Preston Montford, Shropshire) (not known)
1959	4	Meteorology (Malham Tarn, Yorkshire) (6) Meteorology (Preston Montford, Shropshire) (not known) Weather and Flight (Preston Montford, Shropshire) (not known) Oceanography (Dale Fort, Pembrokeshire) (not known)
1960	8	Meteorology (Malham Tarn, Yorkshire) (14) Meteorology (Preston Montford, Shropshire) (17) Weather and Flight (Preston Montford, Shropshire) (24) Oceanography (Dale Fort, Pembrokeshire) (11) Weather and Bird Movement (Dale Fort, Pembrokeshire) (not known)[21] Weekend gliding courses at Lasham (Hampshire), Long Mynd (Shropshire) and Dunstable (Bedfordshire) (numbers not known).
1961	8	Meteorology (Malham Tarn, Yorkshire) (11) Meteorology (Preston Montford, Shropshire) (12) Weather and Flight (Preston Montford, Shropshire) (not known) Oceanography (Dale Fort, Pembrokeshire) (12) Weather and Bird Movement (Dale Fort, Pembrokeshire) (14) Weekend gliding courses at Lasham (Hampshire), Long Mynd (Shropshire) and a series of weekly courses at Portmoak (Kinross) (numbers not known).

[21] Originally called Weather and Bird Movements. Changed to 'Movement' singular in 1962.

YEAR	NO. OF COURSES	COURSES AND VENUES (numbers of students in brackets)
1962	8	Meteorology (Malham Tarn, Yorkshire) Mathematics and Physics in the Field (Dale Fort, Pembrokeshire) Weather and Bird Movement (Dale Fort, Pembrokeshire) Oceanography (Dale Fort, Pembrokeshire) Meteorology (Preston Montford, Shropshire) Meteorology and Gliding (Portmoak, Kinross) (13) Weather and Sailing (Falmouth, Cornwall) Weekend gliding course at Lasham (Hampshire).
1963	7	Meteorology (Malham Tarn, Yorkshire) Mathematics and Physics in the Field – two courses – both at Dale Fort, Pembrokeshire Weather and Bird Movement (Dale Fort, Pembrokeshire) Mathematics and Physics in the Open Air (Preston Montford, Shropshire) Weather and Sailing (Falmouth, Cornwall) Weekend gliding course in Devonshire (venue not known).
1964	7	Meteorology (Malham Tarn, Yorkshire) Mathematics and Physics in the Field – two courses – both at Dale Fort, Pembrokeshire Weather and Bird Movement (Dale Fort, Pembrokeshire) The Physics of Sun, Wind and Water (Preston Montford, Shropshire) Weather and Sailing (Falmouth, Cornwall) Meteorology and Gliding (Portmoak, Kinross) ***Instructors' Meeting held at the Imperial College Field Station, near Ascot, to discuss methods of instruction for field courses.***
1965	4	Meteorology (Malham Tarn, Yorkshire) (12) Weather and Bird Movement (Dale Fort, Pembrokeshire) (11) Weather and Sailing (Falmouth, Cornwall) (24) The Physics of Sun, Wind and Water (Preston Montford, Shropshire) (15)
1966	7	Meteorology (Malham Tarn, Yorkshire) (12) Weather and Bird Movement (Dale Fort, Pembrokeshire) (6) Mathematics and Physics in the Field (Dale Fort, Pembrokeshire) (5) Weather and Plant Ecology (Preston Montford, Shropshire) (10) The Physics of Sun, Wind and Water (Preston Montford, Shropshire) Weather and Sailing (Falmouth, Cornwall) (19) Course at Outward Bound [Sea] School, Aberdovey (Mid Wales).
1967	7	Meteorology (Malham Tarn, Yorkshire) Weather and Bird Movement (Dale Fort, Pembrokeshire) Mathematics and Physics in the Open Air (Dale Fort, Pembrokeshire) Weather and Mathematics (Dale Fort, Pembrokeshire) Weather and Geography (Preston Montford, Shropshire) (15) The Physics of Sun, Wind and Water (Preston Montford, Shropshire) (8) Weather and Sailing (Falmouth, Cornwall) (28)

YEAR	NO. OF COURSES	COURSES AND VENUES (numbers of students in brackets)
1968	6	Meteorology (Malham Tarn, Yorkshire) (20) Weather and Bird Movement (Dale Fort, Pembrokeshire) (10) Mathematics and Physics in the Open Air (Dale Fort, Pembrokeshire) (9) Weather and Mathematics (Dale Fort, Pembrokeshire) Weather and Sailing (Falmouth, Cornwall) (20) Instructor provided for a week-long Weather Cruise course on the English Channel. ***Courses at Preston Montford cancelled because of Foot and Mouth Disease.***
1969	7	Meteorology (Malham Tarn, Yorkshire) (15) Weather and Bird Movement (Dale Fort, Pembrokeshire) (8) Weather and Mathematics (Dale Fort, Pembrokeshire) (12) Weather and Geography (Preston Montford, Shropshire) (12) Mathematics and Physics in the Open Air (Nettlecombe Court, Somerset) (12) Weather and Sailing (Falmouth, Cornwall) (17) Instructor provided for a week-long Weather Cruise course on the English Channel (18).
1970	8	Meteorology (Malham Tarn, Yorkshire) (not known) Weather and Bird Movement (Dale Fort, Pembrokeshire) (12) Mathematics and Physics in the Open Air (Nettlecombe Court, Somerset) (14) Weather and Mathematics (Dale Fort, Pembrokeshire) Weather and Geography (Preston Montford, Shropshire) (5) Weather and Plant Ecology (Preston Montford, Shropshire) Mountain Weather (Drapers' Field Centre, Betwys-y-Coed, North Wales) (13) Weather and Sailing (Falmouth, Cornwall) (11)
1971	3	Mathematics and Physics in the Open Air (Nettlecombe Court, Somerset) (23) Mountain Weather (Drapers' Field Centre, Betwys-y-Coed, North Wales) Instructor also provided for a week-long Weather Cruise course held at the National Sailing Centre, Cowes, for more experienced yachtsmen. ***Six courses cancelled because of a prolonged national postal strike which resulted in late notices and advertisements during the period when enquiries and bookings are normally made. Increased costs of courses and travel also had a deterrent effect.***
1972	6	Meteorology (Malham Tarn, Yorkshire) (15) Mountain Weather (Drapers' Field Centre, Betwys-y-Coed, North Wales) (9) Weather and Bird Movement (Portland Bird Observatory, Dorset) (11) Weather and Plant Ecology (Preston Montford, Shropshire) Meteorology for Science Teachers (Nettlecombe Court, Somerset) Mathematics and Physics in the Open Air (Nettlecombe Court, Somerset) (11) ***The Weather and Sailing course was cancelled because the Falmouth Sailing Centre was unable to confirm the booking.*** ***In November 1972, a meeting of instructors was held in the Department of Geophysics, University of Reading, to discuss present and future courses.***

YEAR	NO. OF COURSES	COURSES AND VENUES (numbers of students in brackets)
1973	8	Meteorology (Malham Tarn, Yorkshire) (6) Mountain Weather (Drapers' Field Centre, Betwys-y-Coed, North Wales) (18) Weather and Bird Movement (Portland Bird Observatory, Dorset) (11) Weather Science and Forecasting (Nettlecombe Court, Somerset) (14) Mathematics and Physics in the Open Air (Nettlecombe Court, Somerset) (10) Air Pollution and Meteorology (Cardiff) (19) Weather and Sailing – one course at Dodnor Creek (near Cowes, Isle of Wight) (11), the other at the National Sailing Centre (Cowes) (11)
1974	8	Meteorology (Malham Tarn, Yorkshire) (8) Mountain Weather (Drapers' Field Centre, Betwys-y-Coed, North Wales) (13) Weather and Bird Movement (Portland Bird Observatory, Dorset) (9) Weather Science and Forecasting (Nettlecombe Court, Somerset) (11) Mathematics and Physics in the Open Air (Nettlecombe Court, Somerset) (8) Air Pollution and Meteorology (Cardiff) (10) Weather and Sailing – one course at Dodnor Creek (near Cowes, Isle of Wight) (13), the other at the National Sailing Centre (Cowes (11)
1975	6	Meteorology (Malham Tarn, Yorkshire) (14) Mountain Weather (Drapers' Field Centre, Betwys-y-Coed, North Wales) (13) Weather and Bird Movement (Gibraltar Point, Lincolnshire) (21) Weather Science and Forecasting (Nettlecombe Court, Somerset) (8) Mathematics and Physics in the Open Air (Nettlecombe Court, Somerset) Weather and Sailing (National Sailing Centre, Cowes, Isle of Wight) (5)
1976	5	Meteorology (Malham Tarn, Yorkshire) (6) Mountain Weather (Drapers' Field Centre, Betwys-y-Coed, North Wales) (18) Weather and Bird Movement (Gibraltar Point, Lincolnshire) (15) Weather Science and Forecasting (Nettlecombe Court, Somerset) (10) Weather and Photography (Nettlecombe Court, Somerset) (6)
1977	4	Understanding Weather [formerly Meteorology] (Malham Tarn) (14) Mountain Weather (Drapers' Field Centre, Betwys-y-Coed, North Wales) (13) Weather and Bird Movement (Gibraltar Point, Lincolnshire) (21) Weather Science and Forecasting (Nettlecombe Court, Somerset) (6)
1978	5	Understanding Weather [formerly Meteorology] (Malham Tarn) (23) Mountain Weather (Drapers' Field Centre, Betwys-y-Coed, North Wales) (14) Weather for Mountaineers (National Mountaineering Centre) (11) Weather and Plant Ecology (Preston Montford, Shropshire) (10) Weather Science and Forecasting (Nettlecombe Court, Somerset) (15)
1979	6	Understanding Weather [formerly Meteorology] (Malham Tarn) (12) Mountain Weather (Drapers' Field Centre, Betwys-y-Coed, North Wales) (6) Weather for Mountaineers (National Mountaineering Centre) (10) Weather and Bird Movement (Gibraltar Point, Lincolnshire) (11) Weather and Plant Ecology (Preston Montford, Shropshire) (not known) Weather Science and Forecasting (Nettlecombe Court, Somerset) (14)

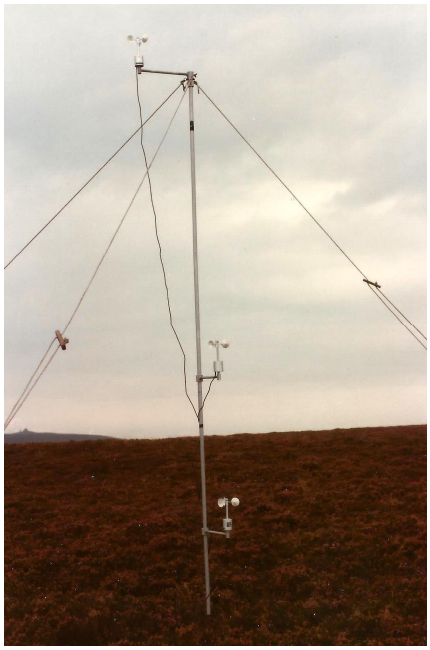
YEAR	NO. OF COURSES	COURSES AND VENUES (numbers of students in brackets)
1980	5	Understanding Weather [formerly Meteorology] (Malham Tarn) (6) Mountain Weather (Drapers' Field Centre, Betwys-y-Coed, North Wales) Weather and Bird Movement (Gibraltar Point, Lincolnshire) (12) Weather Science and Forecasting (Nettlecombe Court, Somerset) (15) Weather in the Hills (National Mountaineering Centre) (4)
1981	5	Understanding Weather [formerly Meteorology] (Malham Tarn) (9) Weather and Bird Movement (Gibraltar Point, Lincolnshire) (11) Weather and Sailing (Surbiton) (5) Weather Science and Forecasting (Nettlecombe Court, Somerset) (8) Weather and Plant Ecology (Preston Montford, Shropshire) (9)
1982	6	Understanding Weather [formerly Meteorology] (Malham Tarn) (10) Weather and Bird Movement (Gibraltar Point, Lincolnshire) (11) Weather Under Sail (English Channel) (7) Weather Science and Forecasting (Nettlecombe Court, Somerset) (6) Mountain Weather (3) Weather in the Hills (5)
1983	4	Understanding Weather [formerly Meteorology] (Malham Tarn) (11) Weather and Bird Movement (Gibraltar Point, Lincolnshire) (16) Weather Science and Forecasting (Nettlecombe Court, Somerset) (10) Weather Under Sail (English Channel) (7)
1984	5	Understanding Weather [formerly Meteorology] (Malham Tarn) (14) Weather and Bird Movement (Gibraltar Point, Lincolnshire) (9) Weather Science and Forecasting (Nettlecombe Court, Somerset) (10) Weather in the Hills (Betws-y-Coed, North Wales) (6) Weather Under Sail (English Channel, out of Medina Valley Centre, Isle of Wight) (4)
1985	6	Understanding Weather [formerly Meteorology] (Malham Tarn) Weather Science and Forecasting (Nettlecombe Court, Somerset) Weather and Bird Movement (Gibraltar Point, Lincolnshire) (9) Weather Under Sail (English Channel, out of Medina Valley Centre, Isle of Wight) Climate and Plant Ecology (Preston Montford, Shropshire) Understanding Mountain Weather (Plas-y-Brenin)
1986	6	Understanding Weather [formerly Meteorology] (Malham Tarn) (8) Weather Science and Forecasting (Nettlecombe Court, Somerset) (5) Weather under Sail (English Channel out of Salcombe) (8) Weather in the Hills (Betwys-y-Coed) Understanding Mountain Weather (2 weekend courses at Plas-y-Brenin) (?)
1987	8	Understanding Weather [formerly Meteorology] (Malham Tarn) (8) Weather Science and Forecasting (Nettlecombe Court, Somerset) (10) Mountain Weather (Drapers' Field Centre, Betwys-y-Coed) (7) Weather under Sail in May (English Channel, out of Salcombe) (8) Weather under Sail in September (English Channel, out of Salcombe) (8) Weather and Bird Movement (Gibraltar Point, Lincolnshire) (15) Understanding Mountain Weather (2 weekend courses at Plas-y-Brenin) (?)

YEAR	NO. OF COURSES	COURSES AND VENUES (numbers of students in brackets)
1988	5	Understanding Weather [formerly Meteorology] (Malham Tarn) (10) Weather Science and Forecasting (Nettlecombe Court, Somerset) (9) Weather and Bird Movement (Gibraltar Point, Lincolnshire) (15) Understanding Mountain Weather (4-5 June at Plas-y-Brenin) (7) Understanding Mountain Weather (25-26 June at Plas-y-Brenin) (6)
1989	8	Understanding Weather [formerly Meteorology] (Malham Tarn) (4) Weather Science and Forecasting (Nettlecombe Court, Somerset) (4) Mountain Weather (Drapers' Field Centre, Betwys-y-Coed) (5) Waders and the Weather (Castle Head Field Centre) (12) Weather and Bird Movement (Gibraltar Point, Lincolnshire) (10) Weather under Sail in May (English Channel, out of Salcombe) (8) Weather under Sail in September (English Channel, out of Salcombe) (8) Understanding Mountain Weather (weekend course at Plas-y-Brenin) (6)
1990	7	Understanding Weather [formerly Meteorology] (Malham Tarn) (4) Weather and Bird Movement (Gibraltar Point, Lincolnshire) (7) Bird-watching around Morecambe Bay (Grange-over-Sands) (18) Weather under Sail (English Channel, out of Salcombe) (8) Weather under Sail in September (English Channel, out of Salcombe) (8) Understanding Mountain Weather (June weekend course, Plas-y-Brenin) (7) Understanding Mountain Weather (Oct weekend course, Plas-y-Brenin) (7)
1991	5	Understanding Weather [formerly Meteorology] (Malham Tarn) (7) Weather and Climate (Nettlecombe Court, Somerset) (10) Weather under Sail in May (English Channel, out of Salcombe) (2) Understanding Mountain Weather (June weekend course, Plas-y-Brenin) (6) Understanding Mountain Weather (Oct weekend course, Plas-y-Brenin) (6)
1992	3	Understanding Weather [formerly Meteorology] (Malham Tarn) (11) Understanding Mountain Weather (weekend course at Abergavenny) (8) Weather and Bird Movement (Gibraltar Point, Lincolnshire) (10)
1993	5	Understanding Weather [formerly Meteorology] (Malham Tarn) (5) Weather and Bird Movement (Gibraltar Point, Lincolnshire) (7) Three sailing courses also ran (18 participants in total)
1994	3	Understanding Weather [formerly Meteorology] (Malham Tarn) Weather and Bird Movement (Gibraltar Point, Lincolnshire) (9) Mountain Weather (Betwys-y-Coed) (8)
1995	3	Understanding Weather [formerly Meteorology] (Malham Tarn) (7) Weather and Climate (Nettlecombe Court, Somerset) (7) Weather and Bird Movement (Gibraltar, southern Europe) (10)

THE WEATHER AND CLIMATE COURSE

Photographs courtesy of Geoff Jenkins.

Measuring wind and temperature profiles, Nettlecombe Court.



Measuring wind profiles, Dunkery Beacon, Somerset.

Measuring wind profiles, Blue Anchor Bay, Somerset.

Anemometers, Nettlecombe Court.

INDEX OF INSTRUCTORS AND LECTURERS