

SECOND LEGISLATIVE COUNCIL

BRITISH GUIANA (CONSTITUTION) (TEMPORARY PROVISIONS)
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THIRD SESSION

1959-1961

**MEMORANDUM ON THE REPORT OF THE DEPUTY
DIRECTOR, WEST INDIES METEOROLOGICAL SERVICE,
ON HIS VISIT TO BRITISH GUIANA - 4TH TO 8TH
APRIL, 1960.**

Following the fire and the occupation of the re-conditioned terminal building on the south-east side of Atkinson Airport, Mr. K. V. W. Nicholls, then Deputy Director of The West Indies Meteorological Service, visited British Guiana from 4th to 8th April, 1960, with the main object of checking on Meteorological facilities at the Airport. Mr. Nicholls' Report is attached as Appendix I.

2. In his introductory remarks, he observes that his initial inspection of meteorological facilities and practices at Atkinson Airport disclosed grave deficiencies which stemmed basically from inadequacies in the provision of meteorologically-trained staff and from difficulties in effective supervision during the past ten years. They had been accentuated by the fire which destroyed the terminal building in August, 1959. In paragraph 3 he gives the history of the present meteorological situation in British Guiana and expresses the view that: "It seems fantastic that today in a country the size of the British Isles, containing some sixty-four landing and water strips and two international airports, there is no single official capable of carrying out the routine of an assistant (let alone that of a forecaster) at a main meteorological office."

3. Mr. Nicholls' recommendations are to be found at Paragraph 4 of the Report. The Government has accepted the recommendations in general and has taken action as follows :

4.1. **Additional Staff :** Five meteorological assistants are being recruited.

Provision of Training in Meteorology : Two of the recruited meteorological assistants will be attached to Piarco for training as early as possible.

4.2. **Meteorological Officers to be housed at Atkinson :** Single accommodation for five meteorological assistants is being provided at Atkinson.

4.3. **Testing of Hydrogen Generator at Atkinson:** Hydrogen for pilot balloons is now obtained from the Demerara Oxygen Company and the pressure generator at Atkinson Field is no longer needed.

Pilot Balloons: Pilot Balloons will be resumed as soon as practicable after the recruitment and preliminary training of the five meteorological assistants.

4.4 **Distant-Reading Anemometer and Wind Vane:** The distant-reading anemometer and wind vane has been installed in the Control Tower and is working satisfactorily. Suitable wind indicating instruments have been selected and are on order.

4.5. **Cloud-Searchlight:** The cloud searchlight has been re-sited and re-conditioned. It is now working satisfactorily.

4.6. **Operations Room:** Government has agreed to separate meteorological duties from Air Traffic Control. The Operations Room will

therefore be used only by Air Traffic Control Officers while the Meteorological Assistants will do their observing out of doors.

- 4.7 **Weather Reports:** The recommendation by Mr. Nicholls with regard to the preparation of weather reports will be put into effect when the new Meteorological Assistants assume duty.
- 4.8. **Selected Special Reports:** The issue of Selected Special Reports will be commenced as soon as practicable after the recruitment and preliminary training of the five Meteorological Assistants.

4. Paragraph 5 deals with planning to meet future requirements. The Government states that "there is already the near prospect of a communications basis for a small meteorological network" and that when Lethem is opened to traffic at night, round-the-clock weather reporting there will be essential to aircraft safety. Further, that within the next five to ten years, there will be an imperative requirement for a meteorological service based in British Guiana. The first step towards making such a service possible may be said to be the recruitment of the five meteorological assistants. The possible extension of the observational network and the need for supervision and maintenance of standards suggest that a higher grade of meteorological appointment will have to be made in British Guiana within a few years. The building up of even a modest meteorological service will require an experienced officer with an academic "Honours" background in charge. Mr. Nicholls observes "that it will be upwards of ten years before such an officer can achieve the necessary training and experience to suit him for the post. He recommends the early selection for training of a Guianese with an "Honours" degree in Mathematics and Physics.

Government has accepted this recommendation and Finance Committee is being asked to make provision on supplementary estimates for a post of Meteorological Officer in Training on the salary scale A. 3 (3,696-\$6,720 per annum). It will be a condition that candidates for appointment to this post must be British Guianese with an "Honours" Degree in Mathematics and Physics.

S. It will, therefore, be observed that most of the deficiencies to which attention was drawn in the Report and which could be remedied immediately have been so remedied and that active steps are being taken to lay the groundwork for a proper Meteorological Service for aviation purposes in British Guiana.

C.W. 344/IV.

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Report of Deputy Director, West Indies Meteorological
Service on visit to British Guiana: 4th-8th April, 1960.

1. Diary.

4th April.

- a.m. Arrived Atkinson. Inspected and discussed observational facilities and methods at the airfield with officers of the Civil Aviation Department.
- p.m. Discussions with Director of Civil Aviation and senior Civil Aviation Department officers.

5th April

- a.m. Further discussions with Director of Civil Aviation.
- p.m. Meeting with Postmaster-General, Chief Engineer and Deputy Chief Engineer, Post Office, and Director of Civil Aviation.

6th April.

- a.m. Visit to Meteorological Observatory, Department of Agriculture. Discussions with Senior Observer.
- p.m. -

7th April.

- a.m. Received by Hon. Minister of Communications and Works. Discussions with Minister, Permanent Secretary, Director of Civil Aviation and other senior Ministry and C.A.D. officers.
- p.m. -

8th April.

- a.m. Returned to Trinidad.

2. Introductory remarks.

2.1 It had originally been intended that I should visit Lethem, and arrangements to this end had been made by the Director of Civil Aviation for the day following my arrival. However, my initial inspection of meteorological facilities and practices at Atkinson Airport disclosed grave deficiencies. These stemmed, basically, from inadequacies in the provision of meteorologically-trained staff and from difficulties in effective supervision during the past ten years. In recent months they had, however, been accentuated by the fire which destroyed the terminal building in August 1959, and by the development of a major staff crisis in the Department of Civil Aviation. With the rainy season in early prospect and a substantial geodetic survey by five American B.50's about to be superimposed on normal aviation commitments, it is now of compelling urgency that these deficiencies be made good. Unfortunately, owing to the run-down condition of both the West Indies Meteorological Service and the British Guiana Civil Aviation Department it is difficult to believe that even the most vigorous action can have fully-effective results within the next four to six months.

2.2 In my discussion with the Director of Civil Aviation on the afternoon of 4th April, I learned of proposals (whose present status was uncertain) that the Civil Aviation Department should recruit five "Meteorological Assistants" to its staff: these officers to carry out both Civil Aviation Department and meteorological duties. While it was my clear duty to lend emphatic support to this project I felt nevertheless that much of the long-run benefit of these appointments might be lost unless they were integrated into a reasoned and flexible plan for the development of meteorological facilities for and/or in British Guiana.

2.3 In these circumstances time could not be spared for a visit to Lethem,

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which would have involved a whole day of travel to yield little over half-an-hour at the destination. There were now two types of problem for consideration. The first was the overtaking of existing deficiencies, especially at Atkinson. The second involved a review of likely future requirements, of sources of staff and training patterns - indeed the devising, if possible, of a flexible plan which, by being usually capable of meeting a little more than minimum current needs, would never lag so far behind foreseeable requirements as to provoke a crisis atmosphere when the impact of these was felt.

2.4 By the time I was received by the Hon. Minister of Communications and Works my ideas on this second type of problem had crystallized to a stage when they seemed to be workable, relatively inexpensive and certainly opportune. However, I presented, at the outset, a statement of the deficiencies at Atkinson, the gravity of which was appreciated by all present. At the instance of the Director of Civil Aviation the Minister undertook to endeavour to obtain early authority for the appointment of five "Meteorological Assistants". It was also agreed that after my return the Service would lend the British Guiana Government such replacements for the deficient equipment as it could spare; and that a draft would be dispatched on which an indent for a suitable distant-reading anemometer and wind vane could be modelled.

2.41 My proposals for a flexible plan for the future evoked interest, lively discussion and a favourable consensus of opinion. The Minister asked me to incorporate them in my report, which I was requested to frame comprehensively and in such a way that those sections which met with Government approval could be adapted to the form of a White Paper. Late the same evening the Permanent Secretary took the opportunity to approach me at a social function and to emphasise both the concern with which the Minister viewed the position and the seriousness with which his request for White Paper material had been made. This request has therefore governed the format in which my report is presented.

3. The present meteorological situation in British Guiana.

3.1 Historical

3.11 In the aeronautical field the existing meteorological arrangements for British Guiana stem from the Territory's participation in the British Caribbean Meteorological Conference held in Trinidad in January 1951. The objective of that Conference was to establish a successor organisation to the British Air Ministry Meteorological Office, which urgently wished to divest itself of the mainly aeronautical responsibilities which it had assumed in the Caribbean during World War II. The Conference met under threat of an ultimatum from the Air Ministry (with time-limit twice extended but then standing at 31.3.51) that unless definitive new arrangements were forthcoming it would withdraw its staff and so terminate the existing Service. The Air Ministry had, indeed, only agreed to maintain a commitment in the Area for so long because it had received an assurance that its associated costs from 1st April 1949 would be met from Colonial Development and Welfare sources.

3.12 Under threat of the ultimatum the Conference was able to report complete agreement within three days. In this it was undoubtedly aided by a substantial C.D. & W. provision, augmented by an annual contribution from the British Ministry of Civil Aviation, which was designed to remove most of the cost of the new Service from local budgets during the first five years. The extent of these grants had been agreed in advance of the Conference; so that consideration of extensions to, or provision for the development of, the new Service might have delayed agreement owing to their involving additional demands on local budgets. In these circumstances virtually nothing was agreed beyond a maintenance of the status quo; although a principal local delegate (the Director-General of Civil Aviation) made powerful pleas to the contrary - among them advocating the adoption of the recommendations of the 2nd International Civil Aviation Organization Regional Air Navigation meeting at Havana in 1950 as a minimum development target. There was, however, agreement to provide one modest additional facility: this was "the establishment of a 24-hour reporting station at Mabaruma near Waini Point, British Guiana." Even this has never been implemented, however.

3.13 The restrictive programme adopted by the Conference was especially unfortunate for British Guiana, where no meteorological personnel were stationed at the time of the Conference's report. Today, indeed, it seems fantastic that, in a country the size of the British Isles, containing some 64 landing and water

strips and two international airports, there is no single official capable of carrying out the routine of an Assistant (let alone that of a Forecaster) at a Main Meteorological Office. This point will be taken up again in section 5 herein.

3.14 As the Report of the Conference is now difficult to obtain, the official summary of its recommendations (but with recommendation 6 and the recommended terms of reference of the Director in extenso) is attached as Appendix 1. It will be noted that the Director's terms of reference provide for his being "personally responsible to each participating Colony within the framework of the British Caribbean Meteorological Service for the administration and organization of an efficient Meteorological Service covering the needs both of the Service as a whole and of each colonial unit."

3.15 In order to get the new Service into commission the Air Ministry brought its staff of forecasters and senior officers up to strength with personnel who were allowed to remain in post on special secondment terms for about three years after April 1951. Its locally-engaged staff were all smoothly transferred to the new Service; but these would require at least two years technical training before they could become forecasters, and not all had the ability or temperament to be so trained. Thence began a protracted training and recruitment problem which even today is very far indedd from being solved.

3.16 After the formation of the Federal Ministry of Communications and Works the responsibility for the Service was transferred to that Ministry with effect from 1st May 1958. This achieved outstanding administrative advantages, and although somewhat modifying the form, has not been permitted to affect the content, of the Service's relations with the non-federated territories.

3.17 During the year following the Service's federalization various recurrent difficulties - especially in the field of staffing - came to the notice of the Federal Minister who, in June 1959, appointed a small inter-departmental Working Party to look into these problems and recommend appropriate action. The Working Party's report has now been adopted by Government and is shortly to be tabled as a White Paper. In the meantime its recommendations are being given effect as circumstances permit; their first major impact is likely to be in the field of training.

3.2 Arrangements for aeronautical meteorology, especially with Piarco.

3.21 The West Indies Meteorological Service maintains no staff of its own in British Guiana. Officers of the Department have, however, paid short visits to **Atkinson Airport** from time to time and have given limited instruction to the Air Traffic Control staff there. In addition one of the Atkinson Controllers spent a few weeks at Piarco where he was taught the technique of pilot ballooning with a view to his teaching the other staff in turn. Unfortunately this officer left the Civil Aviation Department some years ago, and it is now most doubtful whether any of the staff at Atkinson could reliably compute a pilot balloon, even if time and the necessary equipment were available. As to the general observing standard at Atkinson a report dated 12th May 1958 by Mr. M.E. Nancoo, Assistant Meteorologist, deserves most earnest study: this is attached as Appendix 2.

3.22 In addition to Atkinson, limited surface observations are taken at several stations of which details will follow shortly. The observers are in some cases Department of Agriculture and in others G.P.O. officers: to some of them the Meteorological Service pays a small allowance for taking observations outside normal hours. Fortunately the Department of Agriculture's meteorological observatory at the Botanic Gardens, Georgetown, is efficiently manned under a capable officer of long service. Training in surface observational work can here be carried out with, I am sure, excellent tutors; but these have had no pilot balloon training, and much of the routine of an Assistant at a Main Meteorological office is outside their scope.

3.23 Exchange of meteorological information as at 9.4.60.

3.231 Piarco receives surface observations from British Guiana as follows:-

- (1) Lethem :)1200, 1500, 1800 G.M.T. observations
- (2) Mabaruma:)

- (3) Enachu : 1200, 1800 G.M.T. observations
(4) Georgetown:)
(5) Atkinson: (Hourly abbreviated observations (AEROS)
(3 hourly full synoptic observations.)

Through Piarco there are transmitted:-

- (1) All Atkinson observations to Miami.
- (2) Observations from Lethem, Mabaruma, Enachu and Georgetown to San Juan.

3.232 Piarco supplies 6 hourly as routine to Atkinson, and also to Miami for the Carmet R.T.T., Cayenne, Recife, Rio de Janeiro, Piarco F.I.C. and on request to other destinations:-

- (1) A 12 hour area forecast for the area from 02N to 10N and from 50W to 60W containing;
 - (a) a summary of the synoptic situation;
 - (b) details of significant weather, including icing (mainly for jets) and turbulence;
 - (c) forecast winds and temperatures at 5000, 10000, 15000, 20000, 30000 and 40000 ft. for the points 10N 60W, 5N 60W, 5N 55W, 5N 50W.
- (2) 12-hour aerodrome forecasts for Piarco, Atkinson, Zanderij, Cayenne, Curaçao.

Atkinson also participates in another implemented routine requirement for the Piarco f.i.c. which partly duplicates the above, viz:-

Every 6 hours, 12-hour aerodrome forecasts are supplied for Piarco, Atkinson, Barbados, Antigua and Maiquetia.

3.233 Piarco supplies other information on request from Atkinson A.T.C., including route forecasts etc. for aircraft leaving Atkinson for destinations outside the area of the routine forecast. To Atkinson are also sent selected special reports (i.e. deteriorations and improvements) for Piarco and Seawell.

3.24 Commentary on the exchange of meteorological information.

3.241 It is at once evident that Piarco is attempting to undertake a substantial forecasting commitment which, if effectively carried out, would meet all the main current aviation forecasting requirements of British Guiana. In striking contrast is the paucity of observations from that territory, where only one station reports more than three times per day.

3.242 The total absence of pilot balloon ascents in British Guiana merits special consideration. In the tropics surface observations of pressure, barometric tendency, temperature and dew point are usually subject to relatively little variation beyond that which arises from diurnal causes. Hence these data have very much less significance for the tropical forecaster than they have in temperate latitudes. In the tropics they may have value in confirming the presence of disturbances which have been detected by other means; but primary reliance can very rarely be placed upon them. The tropical forecaster therefore looks to the upper air for his medium of analysis; and if his network of rawinsonde stations is inadequate (as it usually is) for small-scale inferences then he must look to stream line analysis based on pilot balloon ascents to supplement it. Obviously, therefore, better forecasting for British Guiana implies a requirement for pilot balloons. Note, too, the emphasis in Piarco forecasts on high-level winds and temperatures. These are, of course, interpolated, extrapolated, and conjectured on the basis of distant soundings or occasional reports from jet aircraft. These may (or may not) be sufficiently near the mark for the purposes of their main users: my point here is that since they are at best somewhat doubtfully inferred they are by no means usable as a basis for weather forecasts.

3.243 Now if, as the preceding discussion suggests, the standard of forecasts supplied for British Guiana can be at best moderate for some time to come, then that implies an imperative necessity, in the interests of aircraft safety, for first-class weather reporting. Much will be said later of deficiencies at Atkinson, and still more is contained in Appendix 2. ~~Here~~ I must remark the non-implementation there of one requirement scheduled as implemented in Table MET 2 of ICAO Doc. 7800/2, namely the issue of Selected Special Reports (i.e. deteriorations and improvements in aerodrome weather). Our local instruction on this subject is given at Appendix 3. This should, in my view, most decidedly be extended to Atkinson. But to do that in existing circumstances might create a worse danger than there is now; for the absence of notice of a deterioration could not be construed as evidence that there had not in fact been a deterioration. In present circumstances, therefore, the Service's wisest course is to inform I.C.A.O. forthwith of non-implementation.

3.3 The position at Atkinson Airport.

3.31 A rough plan of Atkinson Airport is given as Appendix 4. It will be noted that the Control Tower is some 1100 yards distant from the Operations Room (which contains the barometer) and from the Stevenson Screen. The barometer is in good order and its readings fit in well with the pattern of Piarco's synoptic charts, although a slight adjustment due to change in height from the former site (concerning which the Director of Civil Aviation has promised exact information) may be necessary. The Stevenson Screen is well maintained.

3.32 The entrance to the Control Room is some 80 ft. above ground level and is reached by external wooden stairs exposed to the weather. No one working in the Control Room could be expected to descend to ground level to read instruments during the course of a watch, especially in bad weather. It would therefore be unreasonable to expect the Controller to make full synoptic reports. At night even the Aero format may not be easy to complete owing to the unserviceability of the cloud searchlight and the absence of a distant-reading anemometer and wind vane. The Control Room is manned continuously from 0715 to 1815 local time and as required outside these hours. There is some likelihood that the airfield may be completely closed at night from 1st May owing to staffing difficulties.

3.33 An officer is at present continuously available in the Operations Room from 0715 to 1815 local time. Outside these hours he is in attendance if no aircraft is in sight, but otherwise he must be in the Control Room. The "day-time" Operations Room officers are usually of a junior grade to the controllers. Their duties include:-

- (1) collecting landing charges from all casual aircraft and keeping an account of landing charges due by all aircraft;
- (2) clearing all aircraft in and out of Atkinson control zone;
- (3) superintending flight operations and the safety of all aircraft within British Guiana. As most of the 64 landing and water strips are without telecommunications, aircraft in transit at these strips cannot be disregarded even after they are presumed to have landed: a close watch on the situation must be maintained.
- (4) Generally operating a British Guiana flight information centre.

3.34 The Operations Room officer is currently charged also with responsibility for the issue of all weather reports. He is extremely badly placed for this duty because:-

- (1) He has a WINDOWLESS office, even the door to which opens on to an interior corridor;
- (2) The exposure is bad otherwise. Immediately behind the office there is a line of forest obscuring some 170° of the lower horizon: in all other directions there is a very gentle convex slope such that the farthest visibility point from ground level does not greatly exceed one mile. The nearest windsock is almost 900 yards distant, so that wind estimates are difficult to make from the sock and possibly distorted by the forest if made from evidence close at hand;

- (3) His other duties often make it very difficult to take observations on time.

3.35 I was informed that the Operations Room officer often consulted the Controller before issuing weather reports, but that practice in this respect was not uniform. At night such a course is not possible; and the disadvantages of working beside a forest, with no distant horizons at all and, of course, no anemometer, wind vane or cloud searchlight, must seriously impair the reliability of night observations.

3.36 As to the possibility of Selected Special Reports it is to be expected that even a moderate thunderstorm may escape the notice of the Operations Room officer in his interior, air-conditioned fastness. By day these could be made by the Controller, but as they would be subject to his other duties permitting, they might, in critical circumstances, fail to be made.

3.37 It is not certain how soon a new (and it is hoped meteorologically better-sited) terminal building will become available. In the meantime the observational position may be improved by better instrumentation (as I shall later recommend) and by more liberal staffing. However it may be several months before either of these measures can have effect.

3.38 It was confirmed by the D.C.A. that so long as the existing staff position continues it is out of the question to expect a resumption of pilot balloon ascents.

3.4 Non-aeronautical meteorology.

3.41 A network of rainfall stations was commenced by the Department of Agriculture in 1846. As these increased in number there were added a nucleus of climatological stations; and the annual rainfall summaries produced by the Department expanded into their valuable "Annual Reports on the Meteorology" which contain full details of the equipment at their stations, several of which cooperate with the Service by disseminating essential synoptic data as mentioned in para. 3.231 above.

3.42 As part of its programme of assembling climatological data for the British Caribbean the Service incorporates averages for several of the Department's stations in its Annual Climatological Summaries. The Service currently undertakes two other non-aeronautical commitments:-

- (1) A forecast for Georgetown only is supplied daily at 1830 G.M.T. for the period of 24 hours commencing at 1200 GMT the following day;
- (2) It sends warnings to the Director of Agriculture of anticipated tropical storms, hurricanes, long swells and statements on the probability of persistence of periods of heavy rain.

3.43 It is a pleasure to record my appreciation of my visit to the Station in the Botanic Gardens, Georgetown, where the advantages of a long-established and competently supervised routine were so agreeably in evidence.

4. Recommendations for Atkinson Airport.

4.1 A first requisite is additional staff and a second is the provision of training in meteorology. I defer consideration of these questions to section 5 and herein assume that meteorologically-trained staff are available.

4.2 Owing to the distance from Georgetown it is very desirable that any officers engaged mainly in meteorological work be housed at Atkinson. This applies particularly to meteorological work because cloud cover more frequently prevents pilot balloons being followed to a good height during the heat of the day than during the early mornings and late evenings. Since good ascents take upwards of an hour in all it is at these times that the need for temporarily augmenting the normal Civil Aviation Department watch will be most felt, and the advantage of having officers available near their work will be very great.

4.3 All tasks connected with the generation of hydrogen can best be entrusted to the Airport Fire Squad. Full instructions for the use of the pressure generator should already be available at Atkinson. As the generator has been at Atkinson for a long period it is desirable that it should be pressure tested. If this cannot be carried out in Georgetown the cylinder should be sent to Head Office now, so pilot balloons can be resumed immediately staff becomes available.

4.4 A distant-reading anemometer and wind vane with dials in the Control Tower is essential. (As agreed a draft indent has been sent under separate cover). A second instrument at least 100 yards from the forest with dials in the Operations Room is also essential if the Control Tower remains from time to time unmanned at night while the Airport remains open.

4.5 Repair and re-installation of the cloud searchlight should be carried out immediately. It should be placed somewhere between an alidade in the Tower (on the small platform outside) and one near the Control Room, the distances being carefully measured. Disposition of the switch (or switches) is governed by the fact that it must be easily operable at night on instructions either from the Tower or from the Operations Room.

4.6 The interior sanctuary now used as an Operations Room should be used to house someone who does not need to be currently aware of the weather. The new Operations Room should have external windows and doors.

4.7 The procedure for preparing weather reports by day should be reduced to formal instructions, since uniformity is very desirable. It is suggested that the Operations Room telephone the Control Tower a few minutes before each hour, when the Controller would dictate either an AERO report or (at synoptic hours) a SYNOP lacking the pressure and temperature and dew point and barometric tendency groups, which would be filled in in the Operations Room. If the Controller is temporarily too busy to do this he should say so, when the Operations Room officer would prepare the report as best he can. A careful log should be kept showing where every report has been issued, together with the name of both the Control and Operations officer at the time.

4.8 As soon as the Operations Room has been given a good exposure the issue of Selected Special Reports should be commenced on a trial basis. If the trials are unsuccessful a statement should be made of the reasons why. Selected Special Reports must certainly be issued as routine immediately the staff situation improves.

5. Recommended planning to meet future requirements.

5.1 Owing to the long period that must elapse before an efficient network of surface communications can be built up throughout an extremely difficult terrain, it seems likely that the development of British Guiana will for some time to come be uniquely dependent on progress in Civil Aviation. It is therefore probable that the Civil Aviation Department will come under increasing pressure to expand its facilities, among which must be included facilities in the associated field of meteorology. Although these in turn will be dependent upon the development of a telecommunications network it seems unlikely that the latter will remain a limiting factor. Already the G.P.O. have W/T and R/T links with officers capable of and/or taking limited observations at Lethem, Mabaruma, Enachu and Potaro. Additionally the D.C.A. plans to instal R/T links within the next three to six months between Atkinson and Kamarany, Lethem, Kato, Mackenzie and either Anai or Wichibai. Thus there is already the near prospect of a communications basis for a small meteorological network; and I was informed that this might probably be supplemented by the cooperation of the Police, whose assistance in such matters has been forthcoming and found essential in other developing countries.

5.2 The pace at which such a meteorological network will grow will be conditioned not by the need for it (which could already be claimed to exist) so much as by general economic and financial considerations. Economic development does not usually restrain itself until it can be ascertained that adequate meteorological facilities are available. More typically the advent of some particular development brings a meteorological requirement into being; and when it is found that this cannot be met there may occur a crisis during which overstrained meteorological resources endeavour to overtake their deficiencies. For example I was informed that Lethem International Airport is shortly to be opened to traffic at night. When that occurs, round-the-clock weather reporting at Lethem will be essential to aircraft safety; yet this has not been catered for in advance planning, and trained staff are certainly not available to carry it out.

5.3 It seems certain that, within the next five to ten years there will be an imperative requirement for a Meteorological Service based in British Guiana. Although, owing to probable changes in the territory's constitutional status and/or affiliations, the forms and scope of this Service is currently very difficult to foresee, there is in my mind no doubt whatever that the requirement will have to be met. Yet in this area all experience shrieks the impracticability of rapidly developing a new Meteorological Service. Planning must, therefore, begin at once.

5.4 The first step towards making such a Service possible may be said to be the Director of Civil Aviation's proposal to recruit five "Meteorological Assistants". I support the proposals that these officers should be regular staff of the Civil Aviation Department and that they should be trained in and carry out other than purely meteorological work. I do not, however, favour the idea that each of these officers should be labelled with a meteorological designation and therefore be earmarked, in preference to their brother officers, for meteorological duties.

5.41 Pure observing work at an airfield, even when pilot ballooning is included, is not a full-time job; in the sense that although an observer must be physically present he will not be continuously occupied with observing duties. Thus a 24-hour observing watch requires a minimum of four "on-the-job" officers (as opposed to the total number including reliefs for leave, sickness etc.) but their observing work should be only a part of their duties. If two 24-hour observing watches are necessary (e.g. at Atkinson and Lethem) the minimum "on-the-job" requirement would be eight. This illustrates the disadvantages of engaging Civil Aviation Department staff under the designation "Meteorological Assistants". Whereas the five such officers now proposed would be barely half the strength required to carry out 24-hour observing duties at Atkinson and Lethem, it by no means follows that the C.A.D. normal establishment for two 24-hour airfields, stiffened by five additional officers, would not be able to cope with all meteorological requirements. How they do it is, of course, a matter for organisation within the Civil Aviation Department.

5.42 The position is quite different if there are added to pure observing duties the many tasks (including the plotting of surface and upper wind charts) that have to be carried out by Assistants at a Main Meteorological Office; thus at Piarco at least nine fully-occupied Assistants are needed to cover the 24-hours. This indicates that if, at some time in future, a Main Meteorological Office is required in British Guiana - or even one or more Dependent Meteorological offices fed by facsimile methods and otherwise from Piarco - there will be an immediate requirement for additional staff trained in the full duties of a Meteorological Assistant at a Main Meteorological Office.

5.5 For these reasons I recommend strongly that all British Guiana Civil Aviation Department officers (including the proposed 5 recruits) below the level of S.A.T.C.O. be given appropriate training in meteorology. For Controllers and Assistant Controllers I recommend that this should embrace a full three months learning the whole duties of a Meteorological Assistant at a Main Meteorological Office (preferably Piarco). For part-time and other junior staff at Airfields a month's attendance at the Georgetown Agricultural Station should be adequate. As to the major training the opportunity presented by the five proposed appointments should be taken to send such officers two at a time to Piarco, and later to extend the arrangement throughout the Civil Aviation Department as officers can be spared.

5.51 In this way a cadre of officers fully-trained in all the duties of Meteorological Assistants could be built up, with the aim that if and when the need for a purely meteorological establishment arises in British Guiana a nucleus of trained supporting staff could be made available by temporary secondment or otherwise. Until that time the proposal would have great value in facilitating the extension of pilot balloon ascents to airfields other than Atkinson where Controllers or Assistant Controllers may come to be employed.

5.6 The possible extension of the observational network and the need for supervision and maintenance of standards suggest that a higher grade meteorological appointment will have to be made in British Guiana within a very few years. Ultimately, in my view, the building up of a small meteorological Service will be inevitable; and this will require an experienced officer with an academic "honours" background in immediate charge. I therefore strongly recommend the early selection for training of a Guianese with an honours degree in mathematics and physics. It will, in my view, be upwards of ten years before such an officer can achieve the

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necessary quota of training and experience to suit him for such a post. If the need materialises before that time the West Indies Meteorological Service could no doubt supply a more experienced officer while the Guianese officer under reference continued to gain experience in our Service.

5.61 As and when a requirement becomes more clearly in prospect the training of Assistant Meteorologists (forecasters etc.) can be considered. Candidates with Pass Degrees of outstanding Higher School Certificates can qualify for efficiency in this grade within between one and two years. This problem is therefore not of quite the same urgency, particularly since the W.I.M.S. should be fairly comfortably supplied with such officers within two to three years time.

6. Concluding remarks.

6.1 The statement of the existing position contained in this report and its appendices will, it is hoped, prove sufficiently convincing to evoke in all concerned a determination to contribute towards remedial action with the least possible delay. The following is the present status of the more specific recommendations:-

(1) Action being taken

- (a) A distant reading anemometer and wind vane is being made available on loan to Atkinson from Piarco. The direction indicator of this instrument operates perfectly but the speed indication gives a variable reading from 1 knot to 6 knots too low. (The instrument has been under test at Piarco and it is being sent before tests are completed).
- (b) Draft indents for suitable new wind indicating instruments are being mailed to the D.C.A., who should request full literature direct from Messrs. R.W. Munro Ltd., Gline Road, Bounds Green, London, N.11.
- (c) Pan-American World Airways Inc. have agreed to enquire urgently whether their Meteorology Division can lend two alidades for use with the Atkinson Cloud Searchlight.

(2) Action urgently required

- (a) The immediate re-habilitation and installation of the Cloud Searchlight at Atkinson. (para. 4.5)
- (b) Provision of a more suitably exposed Operations Room at Atkinson (para. 4.6).
- (c) Formulation of instructions for weather-reporting procedure (para. 4.7).
- (d) Action to secure appointment of the five "Meteorological Assistants" to the British Guiana C.A.D. and the early attachment of two of these to Piarco for three months so they they may take up observing and other work at Atkinson as soon as possible (paras. 4.1, 5.4, 5.41, 5.42).

(3) Action required early.

- (a) Testing of the hydrogen generator (para. 4.3)

(4) Action required as soon as practicable.

- (a) Introduction at Atkinson of Selected Special Reports routine (paras. 3.243, 4.8 and Appendix 2).
- (b) Resumption of pilot balloon ascents at Atkinson (paras. 3.242 and 4.3).

(5) Early consideration required of:-

- (a) Training recommendations of all three types (Section 5, passim).
- (b) Availability of housing at Atkinson for staff engaged in meteorological work (para. 4.2).
- (c) Expansion of reporting programme at Lethem to cover night-landing requirements (para. 5.2).

K.V.W. Nicholls

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APPENDIX I

SUMMARY OF RECOMMENDATIONS OF REPORT
OF THE BRITISH CARIBBEAN METEOROLOGICAL CONFERENCE

- Recommendation 1 That provision should be made for the following minor but urgently needed additions to the existing services, without waiting for the appointment of the Director -
- (1) the personnel at Kingston, Jamaica, and at Barbados to be brought up to the minimum strength to enable a 24-hour reporting station at the latter;
 - (2) the establishment of a 24-hour reporting station at Mabaruma near Waini Point, British Guiana.
- Recommendation 2 That all territories in the area should be asked to contribute towards the cost, even if financial considerations in some Colonies should make the contribution a nominal one.
- Recommendation 3 That the service should be organised on a regional basis under a Director and that the Director should be appointed as soon as possible.
- Recommendation 4 That the Secretary of State for the Colonies should be asked to continue the present arrangement under which the cost of the Service (less the Ministry of Civil Aviation contribution) should be charged against the Development and Welfare funds up to 31st March, 1951.
- Recommendation 5
- (1) That the Director should make his headquarters in Trinidad;
 - (2) That the Government of Trinidad and Tobago should be asked to administer the scheme on behalf of the other Governments;
 - (3) That the United Kingdom contribution in respect of trunk air line requirements should be made to the Government of Trinidad and Tobago.
 - (4) That one grant for the area as a whole should be made under the Colonial Development and Welfare Act in favour of the Government of Trinidad and Tobago, to be administered on behalf of the other participating territories; and
 - (5) That the contributions of the other participating territories should be paid annually to Trinidad.

Recommendation 6 Division of cost between the participating Governments.

That the cost falling on local governments should be divided in the following proportions:-#

Bahamas	25%
Barbados	6%
British Guiana	6%
British Honduras	3%
Jamaica	25%
Leeward Islands	2%
Trinidad	30%
Windward Islands	3%

Recommendation 7 Terms of Reference of the Director.

Recommended Terms of Reference of
The Director, British Caribbean
Meteorological
Service*

The Conference recommended that the terms of reference of the Director should be as follows:-

1. To be personally responsible to each participating Colony within the framework of the British Caribbean Meteorological Service for the administration and organisation of an efficient Meteorological Service covering the needs both of the Service as a whole and of each colonial unit.
2. To establish a regional headquarters office in a Colony selected by the participating Governments; the Government of such Colony to be the authority for purposes of discipline and the local administration of the Director and his headquarters staff and for the financial administration of the regional scheme.
3. To consider and report on such matters affecting the British Caribbean Meteorological Service as may be initiated by him or submitted to him and, where necessary for this purpose, to consult Departments and Organisations which make use of the Meteorological Service.
4. To advise on the provisions necessary to meet international meteorological obligations.
5. To implement the accepted policy of Governments in matters affecting the British Caribbean Meteorological Service in the matters referred to in paragraphs 1, 2 and 3 above.
6. To be responsible for regional co-ordination and direction of the meteorological service as a whole, including weather reporting and forecasting procedures, location of stations, equipment, climatology, investigation and research.
7. To submit annual reports and to arrange the publication and dissemination of these reports and of climatological summaries.
8. To represent where required the British Caribbean Meteorological Service at international meetings affecting the Service.
9. To be responsible for the collection and co-ordination of annual estimates of expenditure for the Service in respect of each Colony and the preparation of a comprehensive budget for submission to each participating Government.
10. To be responsible for all staff matters for the whole regional service, subject to the provisions of Colonial Regulations and local General Orders**
11. As circumstances permit, to explore with the participating Governments the possibility of common basic conditions of service for the Meteorological Service, with a view to facilitating complete interchangeability of technical staff within the regional organisation and to such

- 11. Cont'd. to protect the pension rights of the staff; and thereafter to make recommendations to the Governments concerned.
- 12. In matters of pay, discipline, leave, etc. the Director shall be responsible to the Governor of Trinidad and Tobago; in matters affecting the participating Governments he shall correspond direct with the Governments of the territories affected.

* In this context, the British Caribbean area shall be deemed to comprise the Colonies of :-

- The Bahamas
- Barbados
- British Guiana
- British Honduras
- Jamaica
- The Leeward Islands
- Trinidad & Tobago
- Grenada
- St. Lucia
- St. Vincent
- Dominica.

** Air Ministry expatriate staff will remain under the existing Air Ministry conditions of service as regards pay and allowances, leave, tour replacements, etc.

From 1955 these proportions were revised slightly to 26%, 6%, 5%, 2%, 28%, 1%, 30% and 2% respectively. From 1st May, 1958 specific contributions ceased to be paid by the Territories which joined The West Indies Federation.

APPENDIX II

Extract from a report by Mr. M.F. Nancoo,
Assistant Meteorologist, on observing
practices at Atkinson Airport, British Guiana.

I regret to say that the meteorological station at Atkinson is not at all satisfactory. Two days of my visit were public holidays and this left me little time to get the staff together for any instructions in meteorology. I did, however, give some hints to some of the ATC staff. I must confess that the attitude of a part of the staff made it quite plain that any instruction I attempted to give would have been a waste of time.

Most of the staff contended that increased traffic at Atkinson makes it impossible for both air traffic control and meteorological work to be done satisfactorily. They also contended that they were not properly trained to do meteorological work. As far as the latter was concerned, were it not for the staff position at Piarco and the amount of training I thought necessary for the ATC staff at Atkinson, I would have asked your permission to stay on longer at Atkinson.

Because of the importance to the Service of the Atkinson station and because it was evident to me that the observations from Atkinson are in most instances unreliable I beg to suggest that something be done soon about the Atkinson station.

There were some instances during my visit when traffic at observation time delayed the ATC Officer in making the observation but as for the inaccuracy of observations, lack of adequate training and in some instances the unfortunate attitude of officers are causing misleading reports to be received at Piarco. I might add that until now I had good faith in reports from Atkinson and, as a result, might have been misled on occasions.

Little or no attention is paid to the meteorological instruments at Atkinson. I found that the wet bulb muslin had not been changed for a long time. It had rotted and crumpled on being changed. The water bottle was green with moss and obviously had not been changed for a long period. The meniscus of the barometer mercury column was flat but it had not occurred to any one that this was anything wrong. The Stevenson Screen is rotting and when there is rain it gets to all the instruments in the screen. The maximum and minimum thermometers are precariously perched on two nails that have practically rotted away. As far as the theodolite is concerned, when I pointed out that this expensive instrument was not made to be left out in the weather, some members of the staff, although they agreed with me, contended that they just could not spare the time to take it in and out with each balloon observation.

As for the visual observations, I found that not often is sufficient time devoted to these. Again, members of the ATC staff argue that they cannot afford to neglect their ATC work long enough to make a good observation. I pointed out that it takes about the same time to make a good as a bad observation, but an examination of some observation registers proves that I might be wrong in that there is no means of checking the observations and without supervision observations might very well be made from the ATC briefing room where only one quadrant of the sky is visible. The observations must be suspect when a member of the staff can ask me, "Do you think we could spare the time on a rainy night to go outside to inspect the sky?" On one of the days when I was at Atkinson there was a thunderstorm and no entry was made in the register. The remarks column of this register is seldom used. I made a specimen entry of an observation in the register and was informed by a member of the staff that they would not have the time to make such entries.

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I find that estimations of cloud heights and amounts are not always satisfactory. One member of the staff read the barometer about 0.2 mb higher than I did after two attempts and was contending by looking at me that I was reading with an error of parallax. He was quite astonished to learn that there was a metal piece behind the vernier to help avoid errors of parallax and he has been reading the barometer for years.

These are some of the things that I noticed from my short inspection concerning the observations alone. I have brought back two registers an examination of which bears testimony to the inadequacy of the observations. From these, however, it is impossible to check anything. I strongly suspect too that erroneous cloud amounts are reported as excuses for not doing balloons.

Something needs to be done soon to restore some faith in the Atkinson reporting station. As a temporary measure I beg to suggest that a responsible officer be sent to Atkinson to train the ATC staff from the very beginning but faith in Atkinson observations could only be restored by our having an adequately trained and strictly supervised meteorological staff at Atkinson.

I had a discussion with the Deputy Director of Civil Aviation in Atkinson and he has asked for copies of my report to be sent to him as well as the Civil Service and Ministry in British Guiana.

M.E. Nancoo
Assistant Meteorologist

8th May, 1958

WEST INDIES METEOROLOGICAL SERVICE

(EASTERN DIVISION)

Information Circular

From: Meteorological Office, Piarco Airport, Trinidad.

To: Aerodrome Superintendent, Piarco Airport.
 IA(C)L, Piarco Airport.
 All Airlines, Piarco Airport.
 Senior Controller, Seawell Airport, Barbados.
 Senior Controller, Atkinson Airport, British Guiana.
 Senior Observer, Seawell Airport, Barbados.
 Senior Observer, Pearl's Airport, Grenada.

Ref: 03

Date: 19th February, 1960.

Special observations and reports of sudden changes
in meteorological conditions: SELECTED SPECIAL REPORTS.

In accordance with the Air Navigation Plan for the Caribbean Region (ICAO Doc. 7724/2) and Procedures for Air Navigation Services - Meteorology (ICAO Doc. 7605-MET/526) reports of deteriorations and improvements (SELECTED SPECIAL REPORTS) at Piarco and Seawell Airports are made and disseminated when the following sudden changes are observed:-

(a) Cloud height changes

When the height of the lowest cloud of an amount greater than 4 oktas falls to or below, or rises to or above:-

200 feet
 500 feet
 1000 feet

(b) Cloud amount changes

When the amount of the lowest cloud changes from 4 oktas or less to above 4 oktas, or above 4 oktas to 4 oktas or less and the height of the base is 1000 feet or below.

(c) Visibility changes

When the horizontal visibility falls to or below, or rises to or above:-

$\frac{1}{2}$ statute mile
 1 statute mile
 3 statute miles

(d) Wind direction changes

When the mean direction of the surface wind changes rapidly by 45 degrees or more and the speed before or after the change exceeds 20 knots.

(e) Wind speed changes

When the mean speed of the surface wind changes rapidly by 20 knots or more and the speed before or after the change exceeds 10 knots.

(f) Present weather changes

When any one of the following begins, ends or changes in intensity:-

Tornado
 Thunderstorm
 Hail
 Squall
 Duststorm

SELECTED SPECIAL REPORTS of observations made under the above criteria are given immediate circulations as follows:

MKPBZC

Piarco observations to: MKPPZC MKPPZR MKPBYB/MLAKZC MJSJYL MVMMLL
 Seawell observations to: MKPBZC MKPPYL MLAKZC MJSJYL MVMIYL

I.J.W. Potheary
 Assistant Director Eastern Division