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MINUTES (83-196)

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MINISTRY OF SUPPLY

ADVISORY COUNCIL ON SCIENTIFIC RESEARCH  
AND TECHNICAL DEVELOPMENT

A.C.12745 (Unconfirmed)  
BRB.M31

BIOLOGICAL RESEARCH ADVISORY BOARD

A.C.12745  
BRB.M31

MINUTES

THIRTY-FIRST Meeting of the Board, held in Room 140,  
Shell Mex House, W.C.2, on Friday, 19th  
February, 1954, at 11.0 a.m.

Received 31st March, 1954.

Present: Professor Sir Charles Dodds (Chairman), Brigadier F.E. Buckland (D.C.S., M.R.D.), Dr. W. Cawood (P.D.S.R.(D)), Professor R. Cruickshank, Sir Paul Fildes, Professor Sir Howard Florey, Lord Hankey, Dr. D.W. Henderson (C.S., M.R.D.), Dr. C.H. Wansbrough-Jones (Chief Scientist), Air Vice-Marshal T. McClurkin (D.P.B.R.), Professor A.A. Miles, Professor W.T.J. Morgan, Mr. J. Davidson Pratt, Professor Wilson Smith, Dr. D.D. Woods, Mr. F.H. Haylor (Secretary, S.A.C.), Colonel W.W.S. Sharpe (Joint Secretary), Dr. J.E.S. Stone (Joint Secretary)

Wing Commander F.E.W. Birchfield and Major C.E.H. Edwards also attended the meeting.

Apologies for absence were received from Professor G.R. Cameron, Professor E.T.C. Spooner, Professor Sir Eric Rideal and Professor Lord Stamp.

In offering the Board's congratulations to the Chairman on the honour of Knighthood LORD HANKEY said that he would not attempt to describe the immense services which Sir Charles Dodds had rendered and the long and arduous journeys which he had undertaken for the Board. It was unnecessary for him to repeat the list of gold medals and other honours which had been awarded to the Chairman. The Board knew Sir Charles full well and were very sensible of the great honour which had been conferred upon him.

THE CHAIRMAN thanked Lord Hankey and the members of the Board for their congratulations. He said that he was very much aware of the great help and support he had always received from Lord Hankey and the Board, for which he was extremely grateful.

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220. Minutes of the Thirtieth Meeting (A.C.12595/BRB.M30)

The Minutes of the Thirtieth Meeting were confirmed subject to the amendments detailed below:

p.181 - line 11 after "laboratory" delete "for 12 months".

p.185 - Summary of action, Minute 215(b) - for "complementary" read "complementary".

221. Matters arising from the Minutes

Minute 215.

THE CHAIRMAN reminded the Board that they had invited him to prepare a statement for the EW Sub-Committee on EW research in the light of the changes in U.S.A.

In view of the changing situation, the Board would agree that no paper could be prepared until Dr. Henderson's return from America with up-to-date information and he would ask Dr. Henderson to inform the Board how matters stood when he left America on 9th February.

DR. HENDERSON stated that the organisation and policy of U.S.A. for the control of EW research and development remained chaotic, and no decision had yet been made. The Chemical Corps was still nominally in control at Camp Detrick, though a number of the directing civilian staff had been relieved of their appointments and had been restyled 'monitors' to act as advisers to a newly appointed technical director. He in turn was at present responsible to a Service Officer of the rank of Colonel stationed at Camp Detrick, the representative of the Chief of the Chemical Corps. The proposal to transfer direction of research to an industrial concern, scheduled to take effect on 1st January, had fallen through, since the only firm to tender, the Mathieson Chemical Corporation, had finally decided not to accept the contract. As a result it had been officially decided not to pursue the question of industrial control further.

The Chief of the Chemical Corps, General Bullone, would be leaving at the end of March; his successor had not yet been appointed. Mr. Wilson, Secretary of Defence, would in future have a greater say in research and development for the Services.

As a direct result of these changes the morale of the research staff had suffered badly and many of the workers were seeking employment elsewhere.

There had also been changes in policy in Service requirements; thus the plan in operation at the beginning of 1953 for the production of Br. suis at Pine Bluff, which was threatened to be superseded by one for the production of anthrax spores, seemed again to be favoured.

In the discussion which followed, THE CHAIRMAN asked whether the policy of reverting to the production of Br. suis at Pine Bluff could be regarded as firm. DR. HENDERSON said that the future policy would depend on the Service with the greatest influence at the time; the U.S.A.A.F. wanted "N", the Army "US". DR. CAWOOD said that it was at present difficult to have any views as to how the policy of this country would be affected. He hoped that developments would be more favourable to us than was the Mathieson project. It was true that we were depending on the United States for some things. THE CHAIRMAN recalled his report to the Minister after the members of the Board had visited America in 1952. In his report he had recommended that we should rely on American production for the present. DR. CAWOOD said that the Minister had been warned and would be informed more fully of the changes which had taken place.

/SIR PAUL

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SIR PAUL FILDES emphasised the importance of informing the EW Sub-Committee. He informed the Board that he, Sir Charles Dods and Lord Stamp, as independent members, had called a limited meeting of the EW Sub-Committee in order to place all the facts before the Chiefs of Staff Committee. SIR PAUL asked the Board to support this action.

DR. HENDERSON said that he had already informed Dr. Quarles, the American Assistant Secretary of Defence, that we were not relying on them for EW weapons, which he considered were not yet perfected. He had also discussed this with Dr. Vance, Assistant to General Uncles of the Army G. Staff. In reply to Sir Paul, DR. CAWOOD explained that the provision of Experimental Plant No.2 had been deferred, but not cancelled. DR. HENDERSON added that the Americans were not incapable of production; future plans would depend upon what the research workers were allowed to do.

SIR PAUL felt that American production should not be relied upon. He was anxious that the Chiefs of Staff should know all the facts. DR. WANSBROUGH-JONES pointed out that the Sub-Committee had received a verbal report on the position in the United States from Dr. Henderson at their meeting on 17th February.

THE CHAIRMAN asked for the recommendations of the Board on Sir Paul's proposal to call a limited meeting of the EW Sub-Committee. DR. HENDERSON pointed out that, since General Waitt had ceased to be Chief Chemical Officer, there had been constant changes of policy in the U.S. He cited the history of the Foot and Mouth Disease research programme as typical of this. Again, a proposal to replace the production of Dr. suis by that of B. anthracis had been mooted but this had now been discarded. SIR HOWARD FLOREY said that, in his opinion, the most serious aspect was the demoralising effect of constant changes in policy on the scientists involved.

DR. WANSBROUGH-JONES read out the last paragraph of the Directive on EW which pointed out that, since the Americans were concentrating mainly on the development of weapons capable of early introduction into service, the U.K. programme of weapon development should put greater emphasis on the study of long-term projects. This was a straight question for the Chiefs of Staff who should now be informed by the Board that, owing to the increasing inadequacy of organisation at Camp Detrick, which had led to a state of continual instability, there was progressively less probability that a weapon capable of early introduction would be produced in U.S.A.

After further discussion it was agreed that the Board should support Sir Paul's proposal to inform more fully a special meeting of the EW Sub-Committee of the state of EW research and development in the U.S.A.

#### THE BOARD

Noted with approval the proposal of Sir Paul Fildes to call a special meeting of the EW Sub-Committee in order to place full information before the Chiefs of Staff on the state of the organisation for EW research and development in the United States.

#### 222. Operation Ozone - Statement by the Chief Superintendent, M.E.D.

DR. HENDERSON informed the Board that after his visit to the United States, which he had described (Minute 221 above), he had proceeded to the Bahamas where he had hoped to see the beginning of Operation Ozone.

This had been delayed for three weeks owing to damage to the pontoon. Thanks to the efforts of H.M.S. Ben Lomond the damage had now been put right and he had every reason to believe that the Operation would begin immediately. DR. HENDERSON stated that, unfortunately in his view, a public

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statement, which the Governor had wished to have released, had not been made, as the local executive Council had voted against it.

In spite of the delay the programme remained unaltered except that the virus of Psittacosis, which had been found to be insufficiently stable, would not now be used.

The necessary stocks of *Br. suis* had been received from America but, in case of failure, arrangements had been made to produce this material in the quantities required on site.

In discussion, DR. HENDERSON informed the Chairman and Professor Cruickshank that he would make enquiries as to whether the Admiralty would be prepared to carry on later than 31st May. He also informed Professor Wilson Smith that the information on the stability of Psittacosis virus was gained in the explosion chamber in U.S.A. and that this property was not confined to any particular batch of virus.

223. M.R.D. Annual Report 1952-1953 (A.C.12633/BRB.122)

THE CHAIRMAN said that the Board would agree that the report was an excellent one. The number of publications did great credit to the staff. SIR HOWARD FLOREY agreed that Dr. Henderson should be congratulated. He wished to raise, however, the question of the large ancillary staff of 163. DR. STONE informed the Chairman that this staff included animal handlers, process workers, laboratory attendants, storemen and administrative staff; provision had also to be made in some sections for work to be arranged in shifts. He stated that he would let Sir Howard have full information as to how industrial staff were employed.

THE BOARD:

Congratulated Dr. Henderson and his staff on the Report for 1952-1953 and recommended that the Ministry of Supply should invite the BW Sub-Committee to take note of the Report.

224. The staff complement for M.R.D. Note by the Chief Superintendent.

(A.C.12686/BRB.126)

DR. HENDERSON informed the Chairman that, in compiling his note on the complement for M.R.D., he had consulted some of the scientific members of the Board. The note was based on past recommendations of the Board and had been modified in the light of experience.

In reply to the Chairman, DR. CAWOOD said that C.S. M.R.D.'s demands were not unreasonable - the biggest trouble was getting the men. The proposed allocation of 42 out of the 48 scientific officers required showed only a small difference. One of the factors in getting men was that the Civil Service terms compared unfavourably with those offered elsewhere.

THE CHAIRMAN asked whether it was possible to obtain approval for the complement for the next financial year. DR. CAWOOD thought that it would be possible, but DR. WANSBROUGH-JONES considered that there was no advantage in getting the Treasury to agree to a definite complement. It was preferable not to go again to the Treasury but to get their agreement to higher posts as required.

DR. HENDERSON stated that for the efficient running of the Department it was now essential to get approval for the senior gradings as outlined. In reply to PROFESSOR MILES, who asked which posts were filled, DR. HENDERSON said that one D.C.S.O. post was at present held by his deputy, Brigadier Buckland, and that four more D.C.S.O.'s were required. It would be desirable to be able to change the three agreed medical posts for D.C.S.O.'s or vice versa. DR. WANSBROUGH-JONES pointed out that the

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Treasury would not agree in advance, but that they would sanction ad hoc appointments as the need arose. DR. HENDERSON said that, with Dr. Westwood, he had found it difficult to explain career prospects to him but the structure of the virology unit had been helpful in this case. Where there was no structure it was very difficult to satisfy a prospective candidate.

SIR HOWARD FLOREY asked whether the present situation was affecting recruitment. In reply, DR. HENDERSON said that recruiting was made much more difficult without a definite structure and establishment. PROFESSOR WILSON SMITH supported this view; senior men would always want to know full details of prospects and of the build up of an institution. He thought that Dr. Henderson's point was a good one. SIR PAUL FILDES agreed.

Discussion then took place on the three unestablished medical posts to which Treasury agreement had already been obtained. DR. HENDERSON pointed out that such appointments should be established. DR. WANSBROUGH-JONES asked Dr. Henderson whether he wished to surrender the three medical posts. DR. HENDERSON replied that he would be willing to surrender them. DR. WANSBROUGH-JONES was very reluctant to give up the three medical posts for which a great fight had been made; D.C.S.O. and C.S.O. posts would not be approved in advance by the Treasury.

THE CHAIRMAN said that it was logical to obtain agreement for the medical posts to be established ones, since unestablished posts were unattractive. DR. WANSBROUGH-JONES agreed and suggested that the Board should record their recommendations to this effect.

SIR HOWARD FLOREY considered that Dr. Henderson must be able to change over medical posts for other D.C.S.O.'s, and vice versa, as he had suggested, without recourse to the Treasury. In reply to Professor Cruickshank, DR. HENDERSON said that, of the five D.C.S.O. posts, two or three should be medical men.

In reply to the Chairman, DR. WANSBROUGH-JONES said that the Board should recommend that the suggested complement was the right structure for some years to come.

THE BOARD:

- (a) Noted the Chief Superintendent's proposals for the grading and complement for M.R.D. with approval.

They considered that the structure suggested was the right one for some years to come.

- (b) Noted that certain of the higher posts might be required to be filled by medical men in established positions with salaries of the order of £2750.

225. The rota for retirement (A.C.12467/BRB.124)

THE CHAIRMAN asked the wishes of the Board on the question of retirements. He was reluctant to see any member leave the Board. SIR PAUL FILDES stated that he would like to retire when the time seemed appropriate; MR. HAYLOR said that any member of the Board could retire at any time.

DR. WANSBROUGH-JONES pointed out that there was no need to reduce the numbers of the Board, and, after discussion, it was agreed that a recommendation should be made to Council that the following should be invited to join the Board:

/Professor

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Professor A.W. Downie - University of Liverpool.  
Dr. A.C. Ogston - University of Oxford.  
Dr. R.W. Pittman - University of London.

SIR PAUL FILDES reminded the Chairman that he wished to tender his resignation from the Chemical Defence Advisory Board on which body he had represented the Biological Research Advisory Board.

Dr. Woods was nominated to succeed Sir Paul as the Board's representative on the Chemical Defence Advisory Board. It was suggested by PROFESSOR MORGAN that, if Dr. Pittman should join the Board, he should in due course relieve Dr. Woods as a member of the C.D.A.B.

THE BOARD:

Invited the Chairman to recommend to Council:

- (a) That the rota for retirement should remain in suspension until 31st March, 1955.
- (b) That invitations to join the Board should be sent to:  
Professor A.W. Downie  
Dr. A.C. Ogston  
Dr. R.W. Pittman
- (c) That Dr. D.D. Woods would replace Sir Paul Fildes as the Board's representative on C.D.A.B.

226. Date of next Meeting

The next Meeting was arranged for Friday and Saturday, 2nd and 3rd July, at Porton. The Secretaries were instructed to make the necessary arrangements.

227. Other business

THE CHAIRMAN invited the Board to note the supplementary papers which had been circulated and in particular the Minutes of the Seventeenth Meeting of the Physics and Physical Chemistry Committee of the C.D.A.B. He informed the Board that Council had agreed to ask the Physics and Physical Chemistry Committee of the C.D.A.B. to accept responsibility for advising on the problem of dispersion of BW agents. The Minutes of this Committee would therefore be circulated when, as in this case, matters of interest to the Board were discussed.

The Board noted supplementary papers as below:

Directive by the Minister of Supply on Biological Warfare Research and Development	A.C.12552/BRB.120
BW Research in the U.S.A. - Changes in organisation	A.C.12569/BRB.121
Minutes of the Seventeenth Meeting of the Physics and Physical Chemistry Committee of the C.D.A.B. (5th January, 1954)	A.C.12632/BRB.125
Minutes of the Thirty-first and Thirty-second Meetings of the M.R.C's. BW Defence Committee.	BR/38/31 and BR/38/32.

PROFESSOR WILSON SMITH informed the Chairman that Colonel H.J. Bensted had succeeded him as Secretary of the M.R.C's. BW Defence Committee.

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THE SECRETARY read a letter from the Chairman, S.A.C., advising members of S.A.C. Boards and Committees that, while there was no objection to their revealing that they were members of the S.A.C. organisation (if it was important to them), they should not disclose the name of the particular body to which they belonged.

/Summary

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Summary of actions to be taken

THE BOARD:

<u>Minute</u>		<u>Action by</u>
223	Recommended that the Ministry of Supply should invite the EW Sub-Committee of the Chiefs of Staff Committee to note the Annual Report of the Microbiological Research Department 1952-1953.	The Secretaries.
225	(a) Invited the Chairman to recommend to Council that the rota for retirement should remain in suspension until 31st March, 1955	The Chairman.
	(b) Recommended to Council that an approach should be made to Professor A.W. Downie, Dr. A.C. Ogston and Dr. R.W. Pittman with a view to their becoming members of the Board.	The Secretaries
	(c) Instructed the Secretaries to inform the Secretaries of the S.A.C. and of the C.D.A.B. that Dr. D.D. Woods would replace Sir Paul Fildes as the Board's representative on C.D.A.B.	The Secretaries

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ADVISORY COUNCIL ON SCIENTIFIC RESEARCH  
AND TECHNICAL DEVELOPMENT

BIOLOGICAL RESEARCH ADVISORY BOARD

THIRTY-SECOND Meeting of the Board to be held in  
Room S.92, Shell Mex House, Strand,  
W.C.2, on Tuesday, 15th June, 1954,  
at 11.0 a.m.

AGENDA

Papers

1. Minutes of the Thirty-first Meeting
2. Matters arising from the Minutes

A.G. 12745/FRB.M31 a.

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3. Operation Hesperus - Scientific Report and Report by the Naval Commander A.C. 12635/ERB.123 a.
4. Operation Ozone - Statement by the Chief Superintendent, M.R.D.
5. Trials at sea 1954-1955 - Statement by the Chief Superintendent, M.R.D.
6. The Virus Research Programme - Statement by the Chief Superintendent, M.R.D. A.C. 12809/ERB.127 b.
7. Date of next meeting
8. Any other business
  - a. Previously circulated.
  - b. To follow. *Reserve*

W.W.S. SHARPE  
J.P.S. STONE  
Joint Secretaries to the Board

Room 507,  
The Adelphi,  
John Adam Street, W.C.2.  
Tel: Gerrard 8081, Ext: 2522.  
7 June, 1954.

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MINISTRY OF SUPPLY

ADVISORY COUNCIL ON SCIENTIFIC RESEARCH AND TECHNICAL DEVELOPMENT

A.C.12890 (Unconfirmed)  
BRB.M32

BIOLOGICAL RESEARCH ADVISORY BOARD

A.C.12890  
BRB.M32

MINUTES

THIRTY-SECOND Meeting of the Board, held in Room S.92, Shell Mex House, W.C.2, on Tuesday, 15th June, 1954, at 11.0 a.m.

Received 29th July, 1954.

Present: Professor Sir Charles Dodds (Chairman), Brigadier F. E. Buckland (D.C.S./M.R.D.), Dr. W. Cawood (F.D.S.R.(D)), Professor R. Cruickshank, Sir Paul Fildes, Lord Hankey, Dr. D. W. Henderson (C.S./M.R.D.), Air Vice-Marshal T. McClurkin (D.P.B.R.), Professor A. A. Miles, Professor W. T. J. Morgan, Dr. R. W. Pittman, Professor Wilson Smith, Professor E. T. C. Spooner, Professor Lord Stamp, Major-General G. N. Tuck (D.C.M.), Dr. D. D. Woods, Mr. L. J. H. Haylor (Secretary, S.A.C.), Colonel W. W. S. Sharpe (Joint Secretary), and Dr. J. F. S. Stone (Joint Secretary).

Wing Commander F. E. W. Birchfield also attended the meeting.

Apologies for absence were received from Professor Downie, Sir Howard Florey, Mr. Davidson Pratt, Dr. Wansbrough-Jones and Professor Cameron.

THE CHAIRMAN welcomed General Tuck who was attending a meeting of the Board for the first time, and Dr. Pittman who had become a member of the Board.

228. Minutes of the Thirty-first meeting (A.C.12745/BRB.M31)

The Minutes of the Thirty-first Meeting were confirmed and signed by the Chairman.

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229. Matters arising from the Minutes

Minute 221 - Research organisation in U.S.A.

DR. HENDERSON said that his recent visit had been a short one. The state of affairs at Camp Detrick had never been worse. Resignations of scientific staff were still going on. He stated that by November the virus research unit at M.R.D. would be bigger than that at Camp Detrick.

In Washington the situation was more satisfactory. The Defence Department's new policy was to assess the value of BW rather than to concentrate on Weapon development. Mr. Wilson, the Secretary of Defence, would control demands placed by the Services. Whilst this high level policy was an improvement, the staff at Detrick to carry it out had been greatly reduced.

DR. CAWOOD confirmed Dr. Henderson's remarks. He considered that the situation was unstable. The scientific staff was under a Colonel in whom they did not have confidence. DR. CAWOOD said that he had met General Creasy, the Chief Chemical Officer, and was most impressed by him. DR. CAWOOD stated that the U.S. authorities were taking the reassessment of BW very seriously. A working party had been formed under the code name of "Exercise St. Joe". The party contained Service representatives and was to report by mid-1955 to a committee under the Chairmanship of Mr. Merck. He thought that they might not get a very firm answer by that time. DR. CAWOOD believed that resignations of staff would continue. Dr. Fothergill had stated that Pine Bluff was to change over to the production of anthrax by 1955. DR. HENDERSON, however, said that he thought that it was Washington policy not to change over. The plant at Dugway was producing Dr. suis and would continue to do so.

THE CHAIRMAN thought that Dr. Henderson's and Dr. Cawood's reports confirmed our fears. The conditions at Detrick were very unsettling for research workers.

SIR PAUL FILDES said that what he had heard confirmed his opinion that the Americans were at present of little value as collaborators.

PROFESSOR WILSON SMITH asked how Dr. Fothergill's position was altered. DR. HENDERSON informed him that Dr. Fothergill, who had been Director of the Chemical Corps Biological Laboratories at Detrick, was now technical adviser to Colonel Hayes. Dr. Schwab was now the Director responsible to Colonel Hayes.

In reply to Lord Stamp, DR. HENDERSON said that the Americans were awaiting the results of our trials in the Bahamas with great interest.

Minute 225 - The rota for retirement

THE CHAIRMAN informed the Board that he had heard from Dr. Ogston who had finally decided that he was unable to spare the time to become a member of the Board. The Board then agreed that, in the absence of Dr. Ogston, it would be appropriate to approach Mr. Hill, the Senior Lecturer in Biophysics at the Postgraduate Medical School, Hammersmith.

THE BOARD:

Invited the Chairman to recommend to Council that an approach should be made to Mr. David Hill with a view to his becoming a member of the Board.

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230. Operation Hesperus-Scientific Report (A.C.12635/BRE.123)

DR. HENDERSON said that it would be clear to members from the report that Operation Hesperus had been disappointing. More data had been obtained than heretofore, but because of the weather, the conclusions were not clear, although the technique had proved to be sound. In reply to DR. WOODS, who asked whether the difficulty in sampling had been cleared up, DR. HENDERSON said that the difficulty had been resolved by the use of the raised impinger. No answer had been obtained as to why the pre-impinger caused death of a proportion of vegetative organisms, nor why the raised impinger gave the better results. It was difficult to devise an experiment to find this out.

THE BOARD:

Noted the report.

231. Operation Ozone

DR. HENDERSON said that the results had been received from the ship barely a week before the meeting; there had been no time to assess them. He could say, however, that, for the first time, sea trials had been completely successful and that very useful data would be forthcoming. Three agents had been used and 79 toxic trials carried out. The agents were US, UL and VEE. The object had been to examine the downwind travel of clouds.

Important results had been obtained. For instance, first analyses indicated that the half-life of clouds of these agents was:

Br. suis	..	$\frac{1}{2}$ to 2 mins.
B. tularensis	..	some seconds only (? 20-30)
VEE	..	about 1 minute.

All these trials had been carried out in bright sunlight. In overcast weather the half-life of agents had been considerably extended. In the laboratory, in the absence of direct sunlight, it was shown that after 2 hours 50-50 per cent of organisms survived, after 4 hours 20-30 per cent, and after 24 hours there was a 5-15 per cent survival.

During the operation an apparatus for measuring ultra-violet light had been introduced, and records of relative humidity had been kept.

DR. HENDERSON had decided that, in future, trials in the Bahamas should be terminated by the end of March or mid-April, as the weather deteriorated after this time.

In reply to questions, DR. HENDERSON said that the operation had opened up work which it was essential to follow up. Practical means for carrying out trials in darkness could be found. DR. HENDERSON said that the information on the lethal effects of ultra-violet radiation on organisms in suspension was not new, but that the information on the effect of sunlight on the type of cloud that had been used was of special interest.

DR. PITTMAN suggested that an effort might be made to protect organisms from the effects of light by the addition of particulate carbon or  $\text{TiO}_2$ .

LORD STAMP referred to a recent article on the marked effect of daylight on the counts of viruses in suspension.

In conclusion, SIR PAUL HILDES said that it appeared that, for the first time, trials had given really satisfactory answers. It was probable that, if trials were carried out for 3 or 4 years, it might be possible to assess the BW risk.

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232. Trials at sea 1954-1955

DR. HENDERSON said that all but 6 of the trials on Operation Ozone had been carried out by spraying. Next year he proposed to employ Br. suis, B. tularensis and VEE in the dark. Eastern EE might be used as it was more lethal. He proposed to break new ground and use vaccinia virus. He believed that he could get a good idea of the fate of agents at night. SIR PAUL FILDES was strongly in favour of carrying on such trials; they were absolutely essential in the survey of EW potentialities.

DR. HENDERSON informed the Board that Naval support would be forthcoming again next year if the trials were sanctioned. The ship was already on her way to refit pending this decision.

THE CHAIRMAN asked for the Board's recommendations.

LORD STAMP asked what supporting research could be done in the laboratory before undertaking further field trials, such as work on the coating of organisms and investigation of the effects of light. DR. HENDERSON said that experiments on coating must, for the present, be purely ad hoc in nature.

LORD STAMP said that the paper by Skinner and Bradish, to which he had referred, on the lethal action of daylight, showed that vaccinia virus was easily destroyed in ordinary daylight, but that it could be protected by serum.

THE CHAIRMAN proposed that the Board should recommend:

- (a) that trials should continue;
- (b) that the staff complement of the Microbiological Research Department must be raised to keep in step with the field work.

DR. CAWOOD suggested that during the winter months some of the Canadian workers, who could not carry out field trials at this season, might be spared to work over here.

Discussion followed on the Chairman's proposal. It was suggested that, at this stage, the recommendation about staff should be left out of the proposal to continue trials. If useful answers were forthcoming from the trials, an increase of staff would be necessary. In reply to Professor Cruickshank, DR. HENDERSON said that trials with S. marcescens had been carried out over land; the results followed the same pattern as those obtained on Operation Ozone.

PROFESSOR WILSON SMITH hoped that there would be an opportunity to consider the trials in greater detail before they were carried out. The pros and cons of different agents should be discussed.

THE CHAIRMAN said that the Board would have an opportunity to discuss the trials at a later date. DR. HENDERSON proposed to start trials in mid-November and continue for about four months. He could not lay down precise details.

THE BOARD:

- (a) Recommended that sea trials in the Bahamas should be continued in 1954-1955, the final programme to be discussed at a later date.
- (b) Invited the Ministry of Supply to seek the approval of the Chiefs of Staff for sea trials in 1954-1955.

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233. The Virus Research Programme (A.C.12809/BRE.127)

PROFESSOR WILSON SMITH reminded the Board that work in the virus field was only just beginning. If the trials could be delayed, there was much laboratory work that could be done; but, as it was necessary to have the field trials, the best guess of a suitable agent had to be made. He anticipated no difficulty in taking safety precautions. It was most important to study vaccinia in the laboratory. There were problems to be studied of air-sampling, of stability in the cloud chamber and of production. PROFESSOR WILSON SMITH considered that another important study was that of virus infection by the respiratory route. He was confident that Dr. Westwood had made an excellent start and was building up a good team.

PROFESSOR CRUIKSHANK reminded the Board that there were limits to variola as a weapon. Vaccination in most Continental countries was compulsory, and the U.K. was more vulnerable. He asked whether the rickettsial diseases had been considered. DR. HENDERSON said that Professor Downie had expressed doubts as to whether variola was very dangerous. DR. HENDERSON thought that information about its behaviour should be obtained as a defensive measure.

234. Date of next Meeting

It was agreed that the next Meeting should take place in London on Friday, 3rd September,\* at 11.0 a.m.

235. Other business

(a) Experimental Plant No. 2

In reply to the Chairman, SIR PAUL FILDES said that he had little to add to what he had so often repeated in the last 7 years. The experimental plant and field trials were essential to determine whether BW was a real risk or not. If we could not find out whether filling for a weapon could be produced our work was of little value. SIR PAUL traced the history of the project from 1949 to the present time. He said that the provision of an essential equipment had been postponed, accepted on a reduced estimate and finally deferred for financial reasons.

He recommended that further steps should be taken to press for Experimental Plant No. 2.

THE CHAIRMAN asked Dr. Henderson whether sufficient advances had been made at the Microbiological Research Department to determine what was required. DR. HENDERSON said that in previous years he had been pressed because of an operational requirement. He could assure the Board that it was now known what was required for the continuous culture of bacteria without taking chances.

DR. CAWOOD pointed out that the decision to erect the plant was a very serious step. For instance, if the right staff were not forthcoming, the plant would be a millstone. A strong recommendation by the Board would make negotiations with the Treasury much easier.

In reply to questions as to whether continuous production would require a smaller plant, DR. HENDERSON said that the requirements were similar to those already planned. He had reviewed this scale, and he thought that it was the smallest practicable. LORD STAMF suggested that, as a result of the trials, viruses and not bacteria might be required as agents. DR. HENDERSON said that this might be so, but he referred to Sir Paul's point that experiments in methods of production must go on.

\*Subsequently altered to 29th September, at 11.0 a.m. in Room S.92 Shell Mex House.

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DR. CAWOOD pointed out that production had been successfully achieved by the Americans. PROFESSOR MILES considered that there was no indication at present that viruses would replace bacteria.

SIR PAUL FILDES considered that the argument that the U.S. had produced pathogens in bulk could not be used as a reason for dropping Experimental Plant No. 2. We were not contemplating production, but experimental plant was necessary as a purely research measure to develop the "know-how" of production in the U.K.

THE CHAIRMAN proposed that a paper should be prepared setting forth the technical reasons for the provision of Experimental Plant No. 2. The paper would be considered by Sir Charles Dodds, Dr. Cawood, Dr. Henderson and Air Vice-Marshal McClurkin, who would agree on a draft for submission to Sir Paul for his comments.

DR. HENDERSON reminded the Board that considerable effort had been and was being expended on production problems. A very early decision was required concerning the future of Experimental Plant No. 2. If this were not forthcoming he would feel bound to advise the staff who were engaged on these problems that it would be wise for them to consider their future employment.

THE CHAIRMAN asked the views of the Board.

PROFESSOR SPOONER considered that nothing had occurred to change the views of the Board expressed 7 years ago. PROFESSOR MILES said that this country should not rely on the U.S.A.

SIR PAUL FILDES again emphasised that Experimental Plant No. 2 must be regarded as research equipment only. LORD HAWKEY pointed out that the Board and the BW Sub-Committee must be responsible for pursuing the question. If attacked, we must be in a position to retaliate. We must have the knowledge and the apparatus for acquiring it.

THE CHAIRMAN proposed that the policy of the Board should be reaffirmed.

In reply to Professor Morgan, DR. HENDERSON said that it was too early to consider a plant for virus production. PROFESSOR SPOONER agreed. He considered that we must carry on with research in the production of bacterial agents.

THE BOARD:

Reaffirmed their opinion that Experimental Plant No.2 was a necessary instrument of BW research, and invited the Ministry of Supply to take steps for its construction.

(b) Liaison with the Crop Committee (A.C.12635/BRB.126)

THE CHAIRMAN referred to the minutes of the Chief Scientist's meeting held on 1st April to discuss a new constitution and terms of reference for the Ministry's new Crop Committee, to be called the Agricultural Defence Advisory Committee.

He suggested that the Board should be represented on this Committee or that the papers therefrom should be received by the Secretaries. PROFESSOR SPOONER pointed out that the suggestion in the minutes of the meeting that the new Committee had a defence research commitment for animal diseases was incorrect. It was agreed that the responsibility for such research lay with the Biological Research Advisory Board.

MR. HAYLOR said that Sir William Slater had stated that his Committee was advisory. Veterinary surgeons would advise his Committee, which would refer to the Biological Research Advisory Board any subject of concern to the latter.

~~TOP SECRET/GUARD~~

After discussion it was agreed that the Board should be represented on the new Committee by Air Vice-Marshal McClurkin.

THE BOARD:

Recommended to Council that Air Vice-Marshal McClurkin should represent them on the Agricultural Defence Advisory Committee.

Summary of actions to be taken

<u>THE BOARD:</u>	<u>Action by:</u>
(Minute 229) Invited the Chairman to recommend to Council that an approach should be made to Mr. David Hill with a view to his becoming a member of the Board	The Chairman and Secretaries.
(Minute 232) (a) Recommended that sea trials in the Bahamas should be continued in 1954-1955 - the final programme to be discussed at a later date.	C.S./M.F.D.
(b) Invited the Ministry of Supply to seek approval of the Chiefs of Staff for sea trials in 1954-1955	D.P.B.R.
(Minute 235) (a) Invited the Ministry of Supply to take steps for the construction of Experimental Plant No. 2.	D.P.B.R.
(b) Recommended to Council that Air Vice-Marshal McClurkin should represent them on the Agricultural Defence Advisory Committee	The Secretaries.

CORRIGENDUM

Twenty-sixth meeting (A.C.11950)

Minute 180(c) Line 12:

"the Geneva Protocol of 1952"

Should read

"the Geneva Protocol of 1925"