

April 21st. Holiday. Tiradentes.

The following five persons had luncheon at the laboratory:
Drs. Kerr, Jacobs, Linhares, Mr. Burrus and myself.

April 22nd. Day at the office.

April 23rd. Sunday.

April 24th. Left Rio by Panair plane at 8 AM arriving in Buenos Aires about four in the afternoon, having made only one stop en route at Porto Alegre.

April 25th. Most of the day with Dr. Sordelli at the Bacteriological Institute. Look over the proposed quarters for the virus laboratory and find them highly satisfactory with the modifications which Sordelli has planned. Discuss fellowship candidates and find that two suitable men are available.

Meet Dr. Alberto Fernandez of Venezuela who has been named Director of the new Institute of Hygiene in Caracas and is now visiting other South American countries in order to get ideas. (Dr. Eugenio Suarez of Chile has recently been in Venezuela and is apparently duplicating there what he did in Lima some years ago. The end result of Suarez may well be good although his initial interest is always the same, namely, the production of biologicals having a market value).

Luncheon at Sordelli's home, Drs. Fernandez, ^{Cherini} Zuparini and Soriano being the other guests.

Call at the Department of Hygiene but find that Dr. Sussini, the President, has already left.

To the Brazilian Consulate only to find that my old friend, Dr. Peixoto, has retired because of age and is now in Rio.

Meet the 10.30 train from Tucuman at the Retiro Station and find Dr. Barber without an overcoat although it is uncomfortably cold. Dr. and Mrs. Del Ponte and Dr. Barber have been on a five day jaunt to the pseudopunctipennis country between Tucuman and Jujuy.

April 26th. Attempt to secure passage for Dr. Barber on the 28th but find the plane full. Arrange passage for May 1st.

With Dr. Barber to the Health Department and call on Dr. Miguel Sussini. Dr. Sussini says he has taken up the matter of Foundation collaboration in the virus laboratory with the Minister of the Interior and has secured Government approval.

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Dr. Sussini states that he is leaving the Health Department on a permanent retirement basis early next month. He is unwilling to make a guess as to his probable successor.

Dr. Barber sees and hears, in Spanish, Ferdinando del Toro to fill in the long wait between tea and dinner in Buenos Aires. Dinner at the Plaza Grill with Dr. and Mrs. Sordelli, Dr. and Mrs. del Ponte, Dr. Zuberini, Dr. Barber and Dr. Fernandes present. Dr. Sussini was unable to be present because of the wedding of his only son today. (Josephine Baker had also dined at the Plaza Grill but not at our table).

April 27th.

Finally complete the work of getting visas for Dr. Barber and myself to enter Brazil.

Long discussion of details of the proposed collaboration in virus work with Sordelli. Sordelli has some men who can begin work in the near future and has an adequate supply of mice. He also has some influenza virus which he brought from England a few months ago.

We discuss fellowships and agree on recommending two men, one to be trained especially in work with virus, the other to take additional training in physical chemistry, in which he has already done some special work. The physical chemist is a young Jew who is said to be an exceptionally intelligent person. Sordelli is unwilling to brag so much about the qualifications of the other candidate but feels that he will be satisfactory.

Dinner with Drs. Sussini, Barber and Fernandez at the Jockey Club.

During the past two days I have had an opportunity to discuss the gambiae question with Dr. Barber and am making arrangements for him to go to north-east Brazil to look over the local situation there and give us what help he can. Dr. Barber explained very carefully that he is beyond the Foundation age limit and is down here at present entirely on his own. I assure him I will not take this fact into consideration but will shamelessly try to get just as much out of his visit as if he were on the Foundation payroll.

April 28th.

Leave Buenos Aires at 6 AM arriving in Rio at 5.45 PM with just enough light to land comfortably. The trip is the first I have made by way of Paraguay. Mr. Norment and Mr. Hughes, old friends from the American College in Asunción, were at the flying field together with Dr. Ins^urralde, the Director of the Public Health Department, whom I had not previously met and a young doctor, Dr. Emilio Velilla, who is coming to Brazil soon for training in yellow fever vaccination. One of my old guardas, Fatecha, was also present.

At Iguassú I meet Professor Osuna of the University of Porto Rico, once more. Osuna is en route to Buenos Aires to make arrangements for the Educational Congress there in case the Brazilian negotiations fail entirely.

April 29th.

Day at the office.

April 30th.

Sunday.

May 1st.

Long discussion with EC regarding the organization of the Malaria Service in the North. EC states that there is good work in the distribution of medicine and some beginning of good work in anti-larval service. However, the laboratory and research end of the work is not properly staffed. EC says that we all already know that there are not available in Brazil men to do the work which must be done if the gambiae situation is to be properly studied.

Dr. Barber arrives.

Today is a holiday and everything is closed after lunch. The Brahma restaurant closes its doors while we are ^{at} lunch. In the parade banners in favor of Vargas, Roosevelt and Aranha also have words recommending peace.

May 2nd.

Call with Dr. Barber at the Health Department on Dr. Barros Barreto.

Also call with Dr. Barber on Dr. Fontes and Dr. Neiva at the Oswaldo Cruz Institute.

May 3rd.

Drs. Barber and Jacobs to dinner with Dr. and Mrs. E. Chagas and Mrs. Wilson.

May 4th.

Leave Rio by local Panair service at 6 AM. At Victoria the right motor refused to do any more work but we remained on the float in the middle of the river from 8 in the morning until three in the afternoon when the decision was taken to remain the night in Victoria. We passed by the Rex Hotel and the Hotel Imperial to go to the Majestic Hotel !

I put in a call for Dr. Durval ^{Lima} Lima, the director of the SFA for the State of Espirito Santo. DL arrives at the hotel after considerable delay explaining that his chauffeur had resigned yesterday on arrival in Victoria after a hard trip in the interior stating frankly that he was unwilling to submit to the discipline of the SFA.

With DL and MAB call at the Health Department and see one of my old friends who attempted in all good faith some years ago to create a new subgenus of Anopheles to be called Soperia ! But fortunately his attempt failed and further confusion in the entomological literature was avoided. We found the director of the State Health Service out and went on to the SFA where Dr. Americo Oliveira, director of the State Service soon appeared.

Had we found him at the Health Department the length of our visit could have been determined by us ! AO and I discussed the present situation of yellow fever in the State of Espirito Santo. I assured AO that the epidemic which has cost over 90 cases proven by viscerotomy is now on the decline and that only a few cases are to be expected next month. I admit that there have been failures of vaccination but point out that, even in the worst results we have, at least 50% of those vaccinated have been immunized as shown by the mouse protection test. This year's work, in which vaccination was carried out in October, November and December in the districts where outbreaks of yellow fever were anticipated during the summer and where they did in effect occur, has given us a better check on the results of vaccination than we might otherwise have had at the end of 5 or 10 years' work. I point out that nothing has been found so far to alter our opinion of the value of the present method of vaccination and also am disagreeable to the point of reminding AO of the big outbreak of smallpox in Rio in 1926 in which some 2500 fatal cases occurred. (Dr. AO has been a staunch supporter of the SFA for many years and has taken an active part in getting full collaboration of all local authorities for the vaccination program in the infected districts. AO was in the Health Department in 1932 and was sent to the Valle do Canaan to investigate reported suspect cases. AO autopsied one of the three cases from which liver sections were obtained in the Canaan outbreak.)

Dr. Durval shows with pride the organization of the local office and insists that he has no evidence of stegomyia in the southern part of the State in recent months with the exception of a few adults found near the railway station which suggests to him (as was to have been expected) that the

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adults were brought in from outside the State by the trains.

May 5th.

MAB and I leave on the plane which refused to work yesterday and reach Recife about 3 PM. We visited the SFA office with Dr. Odair Franco. Meet Dr. Geraldo de Andrade, a local light, who presents me with a very attractive volume of which he is the author on the diagnosis of Aneurism! I promise to talk for the local Medical Society some time when passing through Recife on the subject of yellow fever since in extending the invitation GA assures me that no manuscript will be required.

May 6th.

Arrive in Fortaleza by Commodore before three o'clock, and are met by Drs. DBW, Anibal Franca and Mello Silva, the local regional director for the National Department of Health. (S was previously in a similar position in Matto Grosso and is said to have JBB bluffed. S knows that R took receipts from the Panair Company for some eight contos' worth of passages and plans on using this knowledge to secure a trip to Rio and back for himself from R).

- MAB and I put up at Dr. Wilson's house which is much more comfortable than is the hotel.

Sent airmail letter to WAS asking for authorization to pay MAB'S expenses from BA to Miami and suggesting that I go to New York for a conference on the future of the Services in South America.

May 7th.

Spend a fairly quiet Sunday in Fortaleza. We learn that DBW is somewhat more optimistic regarding the situation as a whole than he was just a short time ago. DBW believes, on the basis of reports from Ico, that the gambiae is being blocked in that region and he speaks highly of the work of the three men on the frontiers of the gambiae invasion.

May 8th.

M. G. M. A. S.
Leave for the gambiae district. Lunch at Guarani which is in a zone still free of gambiae. After lunch we stop at Cristaes where a large shed for the disinfection of trucks is being built. This shed has a cement floor, roof and sidewalls of zinc covered sheet iron. The end walls are of cloth on an adjustable frame which permits the volume of the shed to be disinfected to be varied with the size of the truck and its load. (At the present time there is very little traffic on the highways but in a few weeks when the crops begin to move the traffic will be intense and might well be an important factor in the spread of gambiae on towards Fortaleza. A twenty-four hour staff is being put in at Cristaes and every car and every truck coming out of the infected district will be disinfected with a

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pyrethrum spray. The application of the spray will be very easy since a motor and compressor have been installed. Another shed is being planned for the upper end of the infected district in the Jaguaribe Valley and will probably be placed just above Ouro Branco below the point at which the roads from Lavras and Alagoinhas come together.

On to Russas where we found Dr. Scaff in charge of the work. We see for the first time one of the treatment clinics which I mistook at first for a school, such is the order and decorum of the large group seated on benches awaiting treatment.

Drive to Limoeiro where we find Dr. Gerbatin and Dr. Drs. Antunes and Gastão arrive later to be on hand for a visit to the Service here with MAB in the morning.

May 9th.

Spend two or three hours in the morning looking over the drainage work which seems to have been very successful as far as it has gone but which must be extended *too far* considerably to make it fully effective. Additional control has been gotten here by the use, or rather abuse, of Paris Green which is to be seen clearly on the ground where the water has long since disappeared.

Before leaving Limoeiro we call on the Prefeito who says that there has been a great deal of malaria here and a number of deaths. When he is confronted with the local statistics he says that the statistics are not valid since a number of new cemeteries and some old ones which the SFA had closed years ago were reopened some time ago (last year in fact) to take care of the emergency situation. These cemeteries he says were opened only after he had gotten permission from the interventor of the State! In any case the prefeito admits that the situation is such better than last year.

Drive on to Jaguaribe where we found Dr. Novis, who is no heavyweight, in charge. Only now has N gotten instructions to use Paris Green! On to ~~Limoeiro~~ where I put up at the home of Dr. Luis Lessa (three children - Ivan 4 years plus, Elson 2½ years and Marly 1 year), With MAB and DBW going to the hotel.

Late afternoon looking over the Lagoa da Torre where some breeding of gambiae has been found.

Stationary - Iguatú
May 10th.

Trip to Cajazeiras and Lavras. Gambiae found readily with the umbrella technique at two houses at the edge of the açude at kilometer 26 from Icó. Lessa states that breeding was found in Ouro Branco some ten day ago but that only one focus with a few larvae right at the edge of the road was found. Wilson and I drive on from Ouro Branco in a dangerous frame of mind. Fortunately we are in different cars so that poor Dr. Lessa suffers from the ire of only one of us at a time.

An attempt to find adults with the gc in Lavras failed.

MAB and I attempt to find larvae and adults at an açude at kilometers 30 from Icó, only 4 kilometers from where we found them this morning, without success. (Is it possible that the focus in Ouro Branco was an isolated one and that the area between Icó and Ouro Branco is infested only up to kilometer 26 at the present time?) Paris Green is not yet being used here and the problem of control of spread is being attacked only very superficially.

May 11th.

MAB demonstrates both the wet and dry methods of using Paris Green. He believes that in most of our work here the dry method will be better and more economical. Lessa for the first time begins to get some idea of what Paris Green can do. He had tried Paris Green on a focus and been disappointed because the culex larvae were not killed.

We drive to Lima Campos and find Anopheles gambiae with the greatest of ease in the houses. A short unsuccessful search for gambiae along the margin of the açude without success. Adults are, however, found at a house along the road which goes to Iguatú some kilometers above the açude but about three kilometers away from the impounded water above the açude. (Shannon failed to find Anopheles gambiae in the impounded waters last year). In the afternoon DBW remains with LL to work out administrative details for covering the frontier area. DBW calls LL's attention to my order in March that Lavras, Iguatú and other points be treated just as though they were in the infested district, which has not been carried out. Arrangements are being made to send in special capture men and check carefully the distribution of gambiae in these regions and all potential foci in the infested area and in all contiguous areas are to be treated with Paris Green.

MAB and I return to Lima Campos, he to search for Anopheles gambiae in lake above the dam while I go on to look for adults and breeding along the road to Iguatú. Nothing was found by either section of the expedition.

May 12th.

Leave Icó with DBW and MAB at 7 AM stopping at Jaguaribe once more to see Dr. Novis for 30 minutes.

Find Dr. Scaff at Russas where we have lunch. Deaths still continue from malaria here but in smaller scale than last year.

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In the afternoon MAB and I go to Aracaty in the car with Dr. and Mrs. Gilberto Freitas who have just been recently married and are travelling in the company of a female dachshund. (Trouble ahead most probably).

Find Drs. MF, Paulo Antunes and Castro Oliveira anxiously awaiting arrival of MAB. The laboratory is beginning to put on the appearance of a laboratory.

In the evening another long discussion of the Anopheles gambiae problem; MAB believes from what he has seen that we are underestimating the enemy. I assure him that this is not the case and that none of us are satisfied with the present situation but that it takes time to get an organization working especially so since there has been no reserve of trained men to draw from. MAB suggests that we should have 3 or 4 young ~~men~~ here to keep checking everything that is done in the frontier areas and ~~at the same time~~ ~~to keep checking everything that is done in the frontier areas and~~ ~~to keep checking everything that is done in the frontier areas and~~ MAB states that there is a much better than the one-to-a thousand chance of getting rid of A.g. which I have been suggesting but insists that more good men are needed and much more money. I assure MAB that we have had no refusals for money and that we began with this project knowing that millions of dollars would be needed to do the work and that even then the attempt might fail. MAB says that the extension of A.g. to other parts of the continent would surely be a more serious setback for the human race than the so-much discussed European war of the immediate future. Once spread it would undoubtedly be a curse to the continent for centuries. MAB calls the problem a "planetary" one rather than merely a continental one as we have been doing! I assure MAB that I realize the truth of his remarks and that even before we came to the field this time I had written for authorization to go to New York to discuss the needs of this Service with Dr. Sawyer.

May 13th.

MAB gets all set and the first dissection of A.g. was made at 9.30 AM. (Take in custody MAB's passport and \$800 of letters of credit for safe keeping in Fortaleza).

Drs. MF, OC and PA and I spend most of the day learning technique from Dr. Barber and getting ready for to-morrow's trip to Caiçará.

Late in the afternoon MAB looks for a suitable place for field observations on the egg to adult period for A.g. under natural conditions.

Those present for dinner at Chico Leite's were: Dr. Barber, Chico Leite, Manduco, Paulo Antunes, MF, Oliveira Castro, Gilberto Freitas and Mrs. Freitas.

May 14th.

Caiçara
Sunday. Up at 4.15 in order to catch the tide out. Arrive at Caiçará at about 7 AM after two hours' drive, the party consisting of MAB, FLS, MF, Chico, Manduco, OC and PA. Find Dr. Gastão Cezar in Caiçará as expected and the day's work begins at once. First; demonstration of Paris Green mixture using kerozene with a little

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egg white to prevent agglomeration of Paris Green particles. Second; demonstration of preparation of Paris Green dust mixtures. Third; demonstration in the field of the use of Paris Green in kerozene and with sand with actual foci of A.g. Fourth; search for interesting points for study of the distribution of A.g. Fifth; capture of adults in houses for tomorrow's dissection. Sixth; demonstration of umbrella method of finding whether A.g. are or are not present in a house. Seventh; collection of bloods for parasite index. Eighth; spleen index on those giving blood samples. Ninth; examination of places where Paris Green was used earlier in the day. Tenth; studies of distribution of A.g. in two abandoned houses and in nearby inhabited houses. Eleventh; return to Aracaty late in the afternoon at low tide once more. All agreed that they had never seen anything just like the panorama before us as we drove over the wet sand towards the setting sun with the shallow beach on our right and the cliffs weathered by both the wind and the waves on our left.

The local collector of federal taxes reports that he has not been ill with fever and that three others had the same record up to yesterday but one of these three took sick today. It is believed that all of the other persons living in Caiçará have had malaria this year. (Caiçará has 140 houses). The deaths during the month of May 1938 were six, during 13 days of May 1939 37! and this in the face of a rather heavy use of treatment against malaria carried out by our Service. Yesterday afternoon 3580 mosquitoes were taken from the homes visited by the capture squads.

I had an opportunity to demonstrate the value of the umbrella method to several of the men. A house not previously worked was chosen and four well-trained capture men turned loose in it for five minutes during which time they caught 57 A.g. With the umbrella method we got 91 mosquitoes in four minutes. In the same house one square meter of floor gave 36 dead A.g., another gave 17 and two square meters in the lightest room of the house gave 14 more. There must have been over 500 A.g. in the house when we began work.

The afternoon check on the areas treated with Paris Green in the morning gave only 1 small larvae and this died later.

Last evening received telegram from WAS authorizing payment to MAB of excess air passage over boat passage from B.A. together with living expenses while in Brazil!

May 15th.

Much fun, sport and amusement with MF purchasing 4 old umbrellas with rotten covers and arranging to have them covered with white cloth. (Here everything takes a great amount of time and patience).

Drs. Wilson and Hargett arrive with information regarding an outbreak near Passagem das Pedras which has not yet been treated. Thus more material for study is available close to the laboratory. (GC has stated it as his main purpose in life to make gambiae unavailable for study near Aracaty by the end of June).

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DBW says he has decided to take the frontier at Ico away from Dr. Lessa and may even bring him back into the non-infected district still further !

May 16th.

Invitation received for MF to give lecture on malaria before the Commercial Association in Fortaleza. This invitation comes as a result of EC's failure to give his talk last week because of affairs in Belém.

Receive from JAK papers relating to the special credit of 2000:000\$000 for the Ministry of Viação for the airmapping and also a letter from Mr. Inman protesting against the arrangements which have been made with the Ministry. As a result of CGI's letter wire JAK as follows:

PLEASE EXPLAIN DR. VIEIRA URGENCY SITUATION REQUIRING EARLY SENDING PLANES. MALARIA SERVICE URGENTLY NEEDS RAPID MOSAIC MAP WHICH CAN BE MADE IN OUR LABORATORY AT FORTALEZA/ PLEASE ADVISE WHEN WE MAY EXPECT PLANS WITHOUT GROUND PERSONNEL WHICH IS NOT NEEDED FOR THE MAPS FOR THE MALARIA SERVICE PONTO RECENT TRIP LIMA CAMPOS INDICATES NEED OF EXPENSIVE EXTENSION OF WORK THROUGHOUT ENTIRE FRONTIER ZONES PONTO GREATEST ECONOMY POSSIBLE NECESSARY IN MAPPING PROGRAMME TO ALLOW FUNDS FOR CONTROL WORK. SOPER

Discuss with DBW his outline of laboratory activities for the immediate future which was prepared by him after consultation with MF, OC and PA. Advise DBW to get MAB's suggestions and criticism of this plan.

Ask Dr. Hargett to join the staff of the Malaria Service since this service is now in the throes of organization and much more experience can be had here than by spending more time in the Yellow Fever Service. MH agrees and says he is ready for anything. MH insists that there is no need of taking the matter up with his chief, Dr. Thompson, since MH was definitely assigned to work under RF orders here. In MH's presence I advise DBW that MH is in the gambiae army now and takes suggestions from him just as regular staff members would.

Get the first model of the Barber Ferreira Soper square umbrella. Further suggestions for modification were made and a design made for a square umbrella with a detachable handle which is also detachable for work under the roof or at right angles under tables, beds etc. OC also suggests it have a spike at the tip so it can be stuck in the ground inside the houses to permit of one-man operation.

In the afternoon to the field or rather to the swamps to see a demonstration of the Paris Green application with Maneco, DBWm Damasceno Costa, Plinio and a number of inspectors under training.

Dr. Barber, OC and PACA go to a small village 5 miles

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away where malaria is now raging. All have a good afternoon.

May 17th.

Morning at Aracaty. Get ready to take over part of the administrative responsibility here during the next week or ten days while DBW goes to Natal. We agree on sending DC to Lavras, M. Hargett to work with Silva and PACA to the coastal zone between here and the capital of the State.

Return to Fortaleza in the afternoon inspecting the ~~first~~ station at Crystaes. The method is still far from perfect and the shed must undergo several changes before it will be ready to handle the big trucks used to bring in the season's crop. At present the road traffic is light consisting mostly of closed cars which can be properly handled almost without using the shed at all.

Get duly impressed once more by the amount of water there is in the region close to Fortaleza which is not yet infested with gambiae. Should it get into this region the additional cost of control will be enormous.

Arrive Fortaleza at 19.30 and go to Wilson's house for the night. What a comfort to be all ~~alone~~ in a house for one night after the five days in the free republic of Chico Leite and Manduco !

May 18th.

Fortunately I did not go to the office last night on arrival so had a very good sleep in a hammock at Dr. Wilson's home.

Learn that Lessa has asked leave to go to Alagoas to see his father and step-mother, both of whom are ill. The situation in Icó is such that I cannot imagine that DBW will give leave at this time. In fact it comes as a complete surprise to me that Lessa would ask for leave under any circumstances now especially after the visit made by DBW and myself last week !

Refuse to furnish 20,000 tablets of atebirin to Dr. Evandro Chagas explaining to him that I am here at the present time doing work of an assistant of DBW; that the question of atebirin for his service was decided by the three of us in March and that anything which is done now must be done by DBW on the basis of my authorization given at that time. In the face of the urgent need in Timbaúbas I authorize M. Franca to loan him 5,000 tablets while waiting for an answer to the telegram which he has to send to DBW. (Incidentally tell EC that I heard DBW say that 72 tablets of atebirin had been found in one house which shows that the people are not taking the medicine as distributed by him but are storing it for future needs. EC says 5 days treatment with atebirin does not prevent relapses but that seven days does. I assure him that the people in this part of the world are generally refusing treatment at the end of three days). Have a hectic day with Dr. Franca as the principal victim. MF seems to have no idea of training other people to work and get records summarized so that one can keep track of the details of the Service.

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Receive news that Dr. Burke and family arrived in Rio on the 12th of May and are now in Bello Horizonte.

Prepare wire to Kerr reading as follows: ADVISE PINOTTI AND ERNANI DETAILS SITUATION STOP UNDER NO CIRCUMSTANCES PERMIT SUBMISSION NEW PROPOSAL BEFORE MY ARRIVAL STOP SIGO ICÓ SABADO SOPER.

Discuss difficulties of construction of disinfection post at Crystaes with Inman and suggest shortening the length by about two meters and putting doors on both ends for the entry of cars with a roll curtain above the door which can be raised for the passage of trucks with high loads.

Although today is Ascension Day and a federal holiday most of the SMNE is at work. Dr. Franca remains until after 10.30 PM. It reminds one of the SFA during the hectic days of 1930 to 1933). (Lunch at Jangada Club where I get a wonderful build up on the fly in the beer gag).

Arrange collection of very trashy books for Dr. Barber's use from Mrs. Stafford.

May 19th.

Purchase Chevrolet station wagon on a 125" wheel base for 25 contos as an emergency measure. Most of the day spent purchasing umbrellas and other special items for the Service.

May 20th.

Drive from Fortaleza to Icó stopping for lunch at Russas with Drs. Damasceno Costa, Evandro Chagas, Scaff and Gastão Cesar.

EC advises that a case of leishmaniosis has been found at Agua Fria with the primary infection in wild guinea pig. He also shows the results of his house-flitting work at Timbaúbas. He reports that simple flitting in all the houses of a district is sufficient to change the gambiae nysorrhyncus larval ratio in foci from 80/20 to 20/80.

Arrive at Icó at 8 PM.

May 21st.

Sunday at Icó.

Esmerino reports at some length on the survey made between Icó and Ouro Branco. He reports finding adults at Kilometer 426 in several houses about the açude Mariázinha. At Kilometer 429 gambiae larvae were found in the Riacho Urubú. Between Kilometer 429 and 430 a barreiro was found with larvae and was treated with Paris Green. At Kilometer 430 one female gambiae was found in house captures but no foci were found close to the açude Maria Bonita. Between Kilometer 430 and Ouro Branco, at Kilometer 438, no larvae nor adults were found. At Ouro Branco, where a single focus was found two weeks ago, 75 houses were investigated with the umbrella technique with negative results. An additional 6 kilometers beyond Ouro Branco have been carefully investigated with searches for both larvae and adults with negative results.

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Lessa reports that A.g. is now within 2 kilometers of Iguatú !!!

Work is now being done with ^{umbrellas} g.c.'s and Paris Green.

Armando Albuquerque during last week chief of the 6th district, kilometer 400 to 432, all of which is infected. When I ask about recent extension of A.g. here he replies that he does not know since he is new to the district. When asked whether he has worked before, he says in the 8th district, which is that of Iguatú. When asked about this advance he says that they worked during three weeks without material, either petroleum or Paris Green ! (This I presume is due to the fact that Lessa did not want to use Paris Green and did not have oil). Gives, with help of Lessa, details of his work of the week. Reports finding A.g. at kilometer 429 and at a point one league from the road at the level of Mariazinha.

Snr. Sebastião de Paula Madeira, Guarda Chefe of the 9th district which includes the zones next to Iguatú. He reports finding gambiae about 2 kilometers from Iguatú along the road but 1 kilometer from the road which goes from Lima Campos to Iguatú. This last focus was less than 1 kilometer from the Jaguaribe River. This point is some 42 kilometers from Forquilhas where we found gambiae last week just above the açude Lima Campos. The question then is whether this point was infected by the river or along the road by some passing car.

(THE HITITE)

WILSON. Worked with Dr. Lessa. Does not know what he did during the week apparently because of a lack of records which he says were given to Dr. Lessa each day and apparently because he worked with Lessa all week and is afraid to tell all that happened during the week.

Esmerino reports that he has six men at Oró Branco; that nothing has been found in Oró Branco nor six kilometers beyond Oró Branco. It would appear that O.B. itself is now clean and that there is a clean zone of 6 or 8 kilometers on this side and at least 6 kilometers on the other side ! Gave Esmerino the following instructions: 1) Return to O.Branco today and begin work this afternoon on the roads which diverge from Casumbá towards Oró Branco, Alagoinhas and Lavras. If gambiae are found by capture with umbrellas they should continue 6 kilometers beyond the last focus. 2) If no gambiae are found Esmerino should return to Icó with two men leaving the guarda chefe and three men with instructions to make a complete capture in Patos. 3) If gambiae are found they should then work up the river to Lavras searching for both larvae and adults and noting findings. 4) If no gambiae are found at Patos they should descend the river Salgado towards Icó searching for both adults and foci. Until gambiae is located 5) the guarda chefe should then return to Icó for instructions.

Copy of written instructions to Esmerino:

FAZER COM GUARDA-CHUVA:

SÓ - 1. Completar a estrada Ouro Branco a divisa da estrada.

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2. Estrada á Alagoinhas seis quilometros.
3. Estrada á Lavras seis quilometros.

Si encontrar gambiae hoje ou amanhã na estrada acima de Ouro Branco, devem continuar a captura até seis quilometros além do achado.

SI NÃO ENCONTRAR FOCO DE GAMBIAE:

Esmerino com dois capturadores devem voltar a Icó deixando o guarda chefe a tres guardas para fazer a captura completa em Patos. Si não encontrar em Patos devem descer o Rio Salgado em direção ao Icó procurando focos e capturando com guarda-chuvas até encontrar ou fóco our adulto de gambiae.

SI ENCONTRAR GAMBIAE EM PATOS:

Devem subir o Rio em direção a Lavras até Lavras mesmo procurando e anotando focos e adultos.

The microscopic examination confirms gambiae close to Iguatú. Take Damasceno Costa, Lessa and the Guarda Chefe of the 9th district and leave for Icó at 11 o'clock.

Hot Sunday Work
Leave the road at the point where it crosses the RR just outside of Iguatú, that is, about 3 kilometers from the town. Here we turned to the left and walked about 1 kilometer before coming to a mud hole where some eleven or twelve larvae of gambiae were found yesterday. This focus was the only one found here and the people give no history of recent malaria. Rapid captures in two of the nearby houses failed to give gambiae even though they were made with Flit and with an umbrella. On the return trip to the car the Guarda Chefe of the 9th district, who was with us, admitted that he did not know whether there was water in a rice field we were passing or not. We went into the field and found plenty of water and some foci of Anopheles although there were fish in the larger pools. Most of the larvae found were Nyssorhynchus but one was thought to be suspicious by DC. There seemed to be some doubt in the mind of the Guarda Chefe as to whether the focus found belonged to the 8th or 9th district. Lessa has no very clear idea of the geography of the river and town. First, he said that this focus (which is at a sitio known as Cajazeiras) was on the same side of the river as Arará where the SFA found and delivered to the Gambiae Service three adults two days ago. Later, in Iguatú I found that the maps shows Arará across the river from Iguatú but that gambiae were found in zone 71 of the same side of the river as Iguatú. We finally reached Iguatú at about 3.30 after crossing the

May 21st.

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river in a boat and walking on into the town through the sand. No lunch available except eggs and rice and the canned food we brought with us. After the late lunch we visited the post and learned a number of facts. From the map little could be definitely determined but it is clear that the focus found yesterday is up-river from Iguatú due to the fact that the river makes a sharp bend here.

On the return trip we met the camionette and LL's secretary who reports that an inspector at Lavras says he found a focus of Gambiae there three weeks ago and turned it in to the chief inspector who failed to report it to the office. (This may or may not be true).

Possibly more serious is the report that there is a focus waiting for us in Ic6 from Cedro already diagnosed as gambiae. This is indeed bad bad bad news if true.

Discuss the local situation with the Prefeito Dr. Gouveia of the hospital and return to Ic6 at 7 PM.

May 22nd

Examined the focus from the rice field of yesterday failing to find gambiae. Likewise, examined seven larvae from the suspect focus at Cedro, all of which are Nyssorhynchus.

(This is indeed good news).

Esmerino reports complete absence of gambiae in all houses 6 kilometers each way from Casumbá junction. On the basis of this information decide to place disinfection post just this side of the junction. Wire Inman "Place for post has been chosen".

Send Esmerino and two men to investigate the place close to Lavras where it was reported gambiae had been found three weeks ago but not turned in by the Guarda Chefe. He reports later in the day and reports finding only larvae of Nyssorhynchus. The rest of the afternoon Esmerino and his two men work at the Lagoa das Correias about 21 kilometers from Icó on the road to Ouro Branco finding only larvae of Nyssorhynchus although this lake is within the 9 kilometer range. The lake is in many parts deeper than gambiae prefers and has much vegetation both horizontal and vertical, and has many tiny piabinhas. I examined some eight larvae collected by Lessa, DC and myself in this lake and confirmed the diagnosis of Nyssorhynchus. The lake is being given a good dose of Paris Green but if this type of lake and the açudes can be shown definitely not to be breeding gambiae a great amount of labor and material can be saved.

With Lessa and DC and Wilson, the brother of Deusedite spent part of the morning and the afternoon working along the road to Ouro Branco. The house at Mariazinha, where gambiae were found with Dr. Barber, was today negative as was also another house nearby. A third, however, which had a shady lean-to covered with straw gave gambiae, both in the wind-swept lean-to and in the darkened bedroom. Later four houses were searched at Malhada Bonita (also known in my records as Maria Bonita) without results. This is 1 kilometer 30 from where Dr. Barber and I failed to find gambiae but where a small focus and three adults in one house were found a few days ago.

Drive to Casumbá and decide on placing the Cancellia for disinfection at a point 3 kilometers this side of the junction of the roads to Lavras and Alagoinhas. The owner of the house we picked as headquarters was not too enthusiastic at first but finally agreed to rent two rooms in the front of the house and permit a woman to come in from outside to prepare the food for our men who will be working the Barrier.

Tried out the spray-gun with flit in the houses worked today and believe it will be the best equipment to use where transportation of the tank is easy.

See one of the inspectors working with Paris Green, or rather see him bossing two laborers who were working with Paris Green. This was at the Lagoa das Correias referred to above as giving foci of Nyssorhynchus. The men were applying, as was to have been expected at this stage, entirely too much and were throwing it too close to the ground. At another point we found the men working with

May 22nd
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Paris Green in kerosene water mixture where it would have been possible to get road dust nearby but where the earth around the lake was damp.

During the day and in the evening after dinner Lessa constantly refers to happenings in the SFA with due emphasis on all of his own good qualities and good work of the past. Is it possible that Lessa is on the defensive?

May 23rd.

To Lima Campos taking Drs. Lessa and D. Costa and Wilson, the Hittite. Esmerino and two capture men come and are instructed to capture in a double row of some 30 houses, not over 5 minutes in a house with the exception of vacant houses, which should be completely worked. The first two vacant houses yielded one male and one female gambiae each. Four houses worked by us gave no other gambire and the men were reporting the same things after about ten houses. Visit two houses on the hill where both families of five persons each report having had 100% of malaria, some with a second attack after taking regular treatment for five days.

Programme left for DC^{Costa} and Dr. Lessa to carry out: new division to be formed with DC in charge first at Iguatú but later at Lavras. The most important thing now is protection of Iguatú and the river above and below together with the railroads radiating out of Iguatú. Limits to new zone are to be:

- a) river below Iguatú including present zones 171, 172, 173, 181, 182 and 183;
- b) road Iguatú to Lima Campos but leaving Lima Campos and the Açude with Lessa to be worked from Icó;
- c) railroad to Agua Fria (I gave Lessa to work the railroad Agua Fria to Orós;
- d) Railroad Iguatú to Baixio;
- e) Railroad to Alagoinha;
- f) river and railroad to São Matheus;
- g) railroad and river Quinqué to São José;
- h) road Icó to Ouro Branco beginning at and including the Açude at Marizinha kilometer 24;
- i) maintain present limits of service at Lavras.
- j) a circle of 10 kilometers radius about Iguatú as a center is to be thoroughly investigated and control measures organized to zones of kilometers 16 -- last point in which gambiae is found.

(This is a general order and means that work must be carried out for 16 kilometers of clean area in every direction beyond the last known focus. The area must be thoroughly covered by search for foci and by house captures with Flit and umbrella technique).

Instructions are given to get the maps of the SFA of this region. (It seems regrettable that Lessa, who worked here with the SFA and knows these maps perfectly well, has not already gotten them). I agree to leave Esmerino

May 23rd.
-continued-

and the six capture men for survey work. Transportation at present will consist of the new station wagon purchased four days ago in Fortaleza for this job. Also agree to leave the railroad trolley if it can be had from the SFA.

I explain that, although the direct responsibility for the administration of the new division will be with DC, I consider Lessa's most important work in the near future is to furnish the best possible personnel for DC's work. DC requests, and I agree, that the payment of his personnel be made by Lessa, thus avoiding the necessity of organizing a new office force trained in this work. Point out to Lessa that he is to consider those parts of his district which lie in contact with DC's district as Barrier zones and is to work them most intensively and with his best personnel.

Lessa is to be in charge of all necessary treatment work in the region and DC is to do nothing but anti-mosquito work.

Leave Icó about 2 PM and because of long delay in crossing Jaguaribe river decide to spend the night at Limoeiro. At Limoeiro find one of the capture men recently transferred from the Yellow Fever Service. He reports finding 60 houses of 164 ~~infested~~ in Limoeiro with gambiae. This does not look hopeful.

Find Dr. Gebertin arguing that many people must be taking medicine uselessly since a rather high percentage of his cases are 40 years old and over. (G has read some place that malaria in endemic regions is limited to children under 13 years of age!) and this is the man who is charged with the treatment work in this area. When I discussed the fact that treatment is not being given at Peixe Gordo but that the local store there is selling atebirin at 700 reis a tablet, G admits that the guarda there had been found 1,000 tablets short even according to his own records. It is clear that a careful system of checking treatment similar to that used many years ago in the hook worm campaign must be inaugurated.

May 24th.

Drive from Limoeiro to Aracaty and spend a couple of hours there remaining for lunch at the Republic. Learn without surprise that Dr. Barber is not happy over the speed with which immediate wants can be satisfied in this outlying point.

Start prophylactic atebirin at midday today instead of waiting until tomorrow as scheduled. An hour later, en route to Fortaleza, I realized I was having another attack of malaria. I stop en route at Russas and have Dr. Scarf make a smear which showed the presence of vivax. Continued trip to Fortaleza, arriving 6.30 PM right side up with care.

May 25th.

DBW arrives from Rio Grande do Norte and brings a rather hopeful report of the situation there.

May 26th.

E. Chagas' material for Macambira. Macambira is to be control place for expurgo and antimalarial work. EC has received 38,000 atebirin and after discussion of what would be a reasonable basis of closing out our contributions of atebirin to the studies at Timbaúbas, I agree to authorize more making a total of 50,000.

After discussion of personnel situation with Wilson, agree to request the YFS to transfer Dr. Acquer and Jefferson, and the two office employees Castanheira and Heckel.

Send the following telegram to New York: SUGGEST CAUSEY COME IMMEDIATELY STUDYING WITH BARBER WHO PLANS DEPARTURE END JUNE STOP AM ARRIVING RIO MONDAY AFTER THREE WEEKS IN GAMBIAE ZONE I BELIEVE CONFERENCE SAWYER EARLY JUNE INDICATED NEWYORK OR FORTALEZA.

May 27th.

Panair plane for Camocim takes off as scheduled but returns to Fortaleza because of impossibility of landing at Camocim. Decide to drive through to Recife to make connections for Rio there.

Leave Fortaleza at 11.30, make a side trip to Aracaty and arrive in Mossoró at 9 PM. In Aracaty find MAB on the war path as was anticipated. Furnish what appeasement is possible and arrange for Antunes to accompany Barber during the coming week.

May 28th.

Sunday. Leave Mossoró at 8 AM arriving in Recife at 5 PM. Between Angicos and Campina Grande there would seem to be no suitable district for gambiae to invade except some very narrow river valleys which could be easily controlled. Part of the region traversed has suffered from drought this year and was once more -- as in 1932 -- the spectacle of entire families gathered at the roadside in front of every house with both arms extended in a begging gesture. We probably passed 3,000 to 4,000 people along the road under these conditions. Some families, living away from the highway, had constructed snady shelters along the highway to make their contact with the travelling public more comfortable.

May 29th

Recife to Rio by Panair plane.

May 30th.

Missa for Dr. and Mrs. Servulo Lima's silver wedding !!
I promote Princeza to Duqueza copying the precedent set
by Edward, Prince of Wales who became the Duke of Windsor.

Protection test result on the blood of the only suspect
case of yellow fever to occur south of Rio de Janeiro this year is happily negative.

Wire from WAS advises Causey cannot sail before the 15th
of July and asks for more information regarding need for conference now in New York.
Following reply sent: GAMBIAE SITUATION HOPEFUL BUT REQUIRES MORE MONEY MORE
ADMINISTRATIVE PERSONNEL STOP RAINY SEASON NOW ENDING FAILURE TO TAKE MEASURES NOW
WILL DELAY PROJECT FULL YEAR STOP CONSIDER SEPTEMBER TOO LATE STOP IMPOSSIBLE CARRY
PRESENT PROGRAM SOUTH AMERICA WITH PRESENT STAFF STOP IF IMPOSSIBLE SEND ADDITIONAL
PERSONNEL SUGGEST TRANSFER SMITH TO BRAZIL AND WHITMAN TO MALARIA LETTING YELLOW
FEVER TEMPORARILY REST ON ITS LAURELS STOP ALSO SUGGEST TRANSFER COLOMBIA VENEZUELA
BRITISH GUIANA TO CARIBBEAN REGION STOP SUGGEST MINIMUM INCREASE GAMBIAE 1939
\$50 000.00 STOP BELIEVE GOVERNMENT AND FOUNDATION SHOULD PLAN ON TOTAL OF ONE
MILLION DOLLARS 1940 TO ASSURE FINETOOTH CLEANUP RESULTING IN GREAT ULTIMATE ECONOMY
AND MINIMIZING DANGER OF FURTHER SPREAD STOP PRESENT SITUATION DOES NOT JUSTIFY MY
VACATION THIS YEAR STOP BARBER WORKING HARD AND HAS ALREADY BEEN INVALUABLE PROBABLY
REMAINING END JUNE STOP I CANNOT AGREE PAYING SMALL PERCENT TRAVEL EXPENSE BUENOS
AIRES MIAMI STOP IF IMPOSSIBLE PAY FOUNDATION FUNDS REQUEST AUTHORIZATION PAY
GAMBIAE BUDGET.

Learn details of the accident to the Panair plane at
Santarem in which W. S. Antunes was a passenger. Just at the take off the hull
struck a log and sank seven minutes later. By great good luck a small canoe was
close by and was able to save all the passengers. (#SA never learned to swim).

500,000 vaccinations in 1939 completed today. (If all
had been done with good virus our satisfaction would be greater).

Letter from Dr. Torres reports failure of present
government in Bolivia to pay their quota for the Yellow Fever Service. (There is a
new totalitarian government and some one from this office should have gone over there
before now to get things lined up properly. However, there has been no possible
opportunity for any one to get away from Brazil).

Dr. Georges Clarebout is here for study on behalf of the
Medical Service in the Belgian Congo. I first met Dr. Clarebout at Johannesburg
in 1935.

May 31st.

Dr. Pinotti brings in Dr. Candéau who is taken on for
work in the gambiae region. Dr. Candéau is coming to
the gambiae service with the idea of showing during the
period of one year that he is the type of individual who should be considered for a
fellowship in the United States.

Discuss with Drs. Servulo and Waldemar the possibility of

see p. 05