

Postscript relating to new allegations made by Edward Hooper at The Royal Society Discussion Meeting on 11 September 2000

Stanley A. Plotkin^{1*}, Dirk E. Teuwen^{2,3}, Abel Prinzie^{4,5} and Jan Desmyter⁶

¹University of Pennsylvania, Wistar Institute, 4650 Wismer Road, Doylestown, PA 18901, USA

²Laboratory of Virology, Katholieke Universiteit Leuven, Minderbroedersstraat 10, B-3000 Leuven, Belgium

³Aventis Pasteur–Merck, Sharpe & Dohme, Public Affairs, 8 rue Jonas Salk, F-69007 Lyon, France

⁴Faculty of Medicine, University of Louvain, 50 Avenue Mounier, B-1200, Belgium

⁵GlaxoSmithkline, One Franklin Plaza, Philadelphia, PA 19102, USA

⁶Rega Institute, Faculteit Geneeskunde, Katholieke Universiteit Leuven, Minderbroederstraat 10, Leuven, Belgium

At The Royal Society Discussion Meeting, *Origins of HIV and the AIDS epidemic*, which this issue records, Edward Hooper added two new ‘smoking guns’ to the accusations published previously in *The river*. These were proposed as conclusive evidence for the hypothesis that simian immunodeficiency virus-contaminated CHAT polio vaccine caused the HIV-1 group M epidemic. We have investigated the facts in relation to these ‘smoking guns’.

Keywords: CHAT; HIV; polio vaccine; HIV origin

1. THE BELGIAN VETERINARIAN

The first of the ‘smoking guns’ was a statement made by Louis Bugyaki, a veterinarian who is now 80 years old, and who worked previously at the veterinary laboratory at Stanleyville. He acted as a consultant with regard to the feeding problems of the chimps at Camp Lindi, as the caretakers had substantial difficulties in finding a diet the animals would accept. Although in a previous written statement, quoted in the previous article (Plotkin, this issue; Bugyaki 2000*a*) he had denied any knowledge of chimpanzee tissues being sent out of the Belgian Congo, Bugyaki (2000*b*) signed the following statement for Hooper.

Two of the physicians who worked at Lindi (Gaston Ninane and Paul Osterrieth) told me that chimpanzee organs, kidneys for the most part, were sent from Stanleyville to the United States, at the request of Dr Koprowski. It is possible that the dispatch of kidneys had for objective to furnish cells in which the polio vaccines of Dr Koprowski could be cultivated. The Belgian physicians mentioned above told me that chimpanzee kidneys outside of the country should remain secret. I think that there was a strong possibility that it was a commercial secret and that the producers of the vaccine did not want that their competitors, such as Albert Sabin and Jonas Salk, learn the role played by the chimpanzees in the production of the vaccine.

Bugyaki was concerned about quotations in the press after the London meeting and asked to meet with us. He signed a new statement in the presence of two witnesses at the Institut Scientifique de Santé Publique in Brussels. In this additional statement, Bugyaki denies that he was told about chimpanzee organ shipments by Ninane or

Osterrieth, and complains about being misquoted. He insisted that his information came from a laboratory assistant at Lindi in a conversation held many years after the events.

The newest statement by Bugyaki (2000*c*) reads, in part, as follows:

I remember very well having said to these journalists on several occasions that I was not responsible for the camp at Lindi and that I did not work at the Provincial Medical Laboratory at Stanleyville. The information quoted on the subject of chimpanzees came to me from a laboratory assistant, a sanitary agent, who worked at the Provincial Laboratory, and not from the physicians themselves. The articles do not quote me correctly.

That person told me the story on the occasion of a meeting in Belgium, a long time after our return from the Congo. I indicated to the journalists that only Drs P. Osterrieth and G. Ninane could furnish them with first hand information . . .

In fact, the two first-hand witnesses identified by Bugyaki gave opposite testimony. Before his death in July 2000, Ninane had denied sending chimp kidneys abroad, and Paul Osterrieth has repeated his prior denial (see Plotkin, this issue).

Chimpanzee kidneys were never sent to the Wistar Institute, only to Dr Deinhardt at his demand. Dr Koprowski had nothing to do with it. If Dr Bugyaki really told Mr Hooper what he says he did, I really wonder how and where he got these incredible ideas, certainly not from me (Osterrieth 2000).

In addition, we ascertained that the sanitary agent mentioned by Bugyaki was Jean Brakel, deceased in May 1994, who had worked with G. Courtois at the Provincial Medical Laboratory, and who helped at Camp Lindi with regard to the polio and hepatitis experiments. We contacted his widow, who wrote to us as follows:

* Author for correspondence (stanley.plotkin@aventis.com).

My husband performed the surgical procedure for recovering the spinal cord from anesthetized chimpanzees. To my knowledge, no other organs were removed from the corpses (Brakel 2000).

In conclusion, taking into account his two statements to us, the first written in his own hand, the best that can be said is that although Bugyaki's memory of the events is confused, his testimony is in any case about hearsay, not about things he actually witnessed. In the statement taken by Hooper he speculates about the purpose for which chimpanzee tissues were used and about why the subject should have been kept secret. At no point does he recount events to which he was eyewitness. The fact remains that the only factual evidence for transport of chimp kidneys out of the Congo is the shipments made to Fritz Deinhardt (Deinhardt *et al.* 1962).

2. THE SUPPOSED CHIMPANZEES OF BUJUMBURA (EARLIER USUMBURA), BURUNDI

The second 'smoking gun' of Hooper is the allegation that chimpanzees were caged at Bujumbura, that they were subjected to unilateral nephrectomies, and the kidneys shipped to Butare, Elisabethville or Stanleyville for local production of CHAT polio vaccine. These animals are said to have been received from a primate centre of the Institut pour la Recherche Scientifique en Afrique Central (IRSAC) at a place called Kabonambo, supposedly in the Ruzizi Valley. The evidence offered is testimony from a former African worker (called Juma Jamnabas) at the Medical Laboratory of Bujumbura, allegedly corroborated with respect to nephrectomies on chimps by the testimony of another African worker at Camp Lindi (called Antoine).

However, the records of the Medical, Veterinary and Public Health Laboratories at Bujumbura for the period 1957–1960 in the African Archives in Brussels do not confirm the presence of chimpanzees in Bujumbura, nor is there confirmation of the existence of a holding centre at Kabonambo (African Archives 1953–1959; 1956–1960).

In addition, we contacted several persons who worked in Bujumbura. J. Yanssen was a sanitary agent at the Medical Laboratory from 1957 to 1961. He continued to serve the newly installed Burundese government as technical advisor until 1974. His statement is as follows:

On October 25, 2000, I was visited by Mme S Horel [a French journalist] and Mr E. Hooper, under the pretext that she wished to write an article on the quality of the medical services of the former Belgian Congo. . . . To a question concerning which animals there were at Usumbura when I arrived, I replied that there only toads, guinea pigs and later rabbits. To a question about whether there were cages for chimpanzees behind the laboratory buildings, I gave a confident denial in complete confidence. Neither at my arrival, nor after the extension of the buildings. In view of their resistance, I strongly emphasized the fact they were following a false trail, even more concerning the dispatch of chimpanzee tissues to Astrida. I remember having compared their investigations to the periodic search for the Loch Ness monster.

I also insisted on the fact that the personality of Dr F. Dierckx did not fit in any way with the practice of operations on chimpanzees. A clinician and humanist philosopher, he would never have accepted such practices. Moreover, he didn't dispose of the space to do such, and he could not have done it without my knowledge' (Yanssen 2000).

In addition, H. Meyus, who was in charge of the Public Health Service at Bujumbura during 1952 to 1959, states that there were no chimpanzees in the Bujumbura laboratories and no surgery performed there.

From September 1952 till February 1959, I exercised the function of medical doctor-hygienist and of Director of the Hygiene Service (of Ruanda-Urundi). Never have there existed annex buildings, for chimpanzees or other ape species, in the Hygiene Service in Usumbura. Since there were no ape species, obviously, there has never been conducted a hemi-nephrectomy and hence not any type of organ shipment.

To summarize: (1) there were no annex buildings, not for chimpanzees, nor for any other animal species; (2) a hemi-nephrectomy was never done because there were no animals; (3) neither was there any shipment of animal organs, of any species (Meyus 2000).

The testimony of F. Lechanteur, who headed the Medical Laboratory at Bujumbura from May 1957 to March 1958 and also from April 1959 to March 1960, is also pertinent. From March 1958 to March 1959 he directed the Medical Laboratory at Astrida. Thus, he was in a perfect position to know whether chimpanzees or their tissues were available. He confirms that there were no cages for chimpanzees at the Bujumbura Medical Laboratory, and that no chimpanzee organs were received at Astrida (Lechanteur 2000).

As a consequence, there is absolutely no documentary evidence or confirmation by Belgian staff that chimpanzees were ever housed at Bujumbura.

3. SHIPMENT OF KIDNEYS TO BUTARE, RWANDA

Hooper's 'smoking gun' story postulates that the kidneys supposedly removed at Bujumbura were sent to the Veterinary Laboratory at Butare (Queen Astrida Institute) and/or to Elisabethville, where they were supposedly placed in culture for the manufacture of polio vaccine.

We have examined the records of the Veterinary Laboratory at Butare, and find mention of veterinary and human vaccine manufacture, including BCG, smallpox and rabies, but no reference to polio vaccine or to the use of chimpanzee kidneys (African Archives 1947–1955; 1957–1959).

Here we have the first-hand testimony of Constant Huygelen, a veterinarian who testified that he came to the Astrida Institute in late 1957 and that he set up the first tissue culture laboratory there only in 1959, which is confirmed in the 1959 annual report of the institution (African Archives 1957–1959). He clearly states that no chimpanzee kidneys were ever received and that no polio vaccine was ever made in Butare.

I worked in the Veterinary Laboratory of Butare (then called Astrida) from end 1957 until October 1960. When I arrived at the laboratory there was no virological work being done except in animals and the diagnosis of some diseases like rabies. The only work related to human medicine consisted of (1) the production of smallpox vaccine for humans use by scarification of the skin of heifers and inoculating them with vaccinia virus and (2) the production of Fermi-type vaccine use by intracerebral inoculation of sheep and harvesting their brains a week later (Huygelen 2000a).

In addition, G. Van den Abbeele, head of the Astrida Medical Laboratory, states categorically that no chimpanzee kidneys were used there.

To my knowledge there were no chimpanzees kept at the Ujumbura Medical Laboratory. During the Astrida period, we did not use primary cell cultures. There were no chimpanzees in the animal house. We never received organs from Ujumbura (Van den Abbeele 2000).

There is also the witness of H. Vanderborght, who came to Astrida in 1967 to head the IRSAC laboratory, and who did not see or hear of any preceding housing of chimps in Butare (Vanderborght 2000).

During his talk at The Royal Society, Hooper stated that the chimps operated on in Bujumbura came from and were sent back to a holding station in Kabonambo, in the Congo, which he says was also headquarters for the Ruzizi vaccination with CHAT polio vaccine. However, Kabonambo is in Burundi, and no record exists of chimps having been kept there. Another witness, U. Rahm, came with her husband to the Congo in mid-1958 in order for him to take up his position as director of the Mammalogy Department at IRSAC in Lwiro. She has no knowledge of chimpanzees being kept in the Ruzizi or in a place called Kabonambo (Rahm 2000).

4. ELISABETHVILLE

The other veterinary laboratory postulated by Hooper to have manufactured polio vaccine was at Elisabethville, where veterinarian Tadeusz Wiktor is specifically named as the person who produced the vaccine.

However, the archives of the Elisabethville Veterinary Laboratory for 1957–1960 make no mention of work on polio vaccine (African Archives 1954–1958*a, b*).

A key witness to events at Elisabethville is S. Pattyn, a virologist who worked at the nearby Bacteriological Laboratory. He would have had knowledge of local production of polio vaccine, but his statement below is quite clear in its denial.

I can confirm that between 1955 and 1960 no tissue cultures were done in the veterinary laboratory at Elisabethville (Lubumbashi) and that certainly poliovaccine was never produced there nor elsewhere in that city during that period (Pattyn 2000).

We also interviewed three Belgian veterinarians who worked with Dr Wiktor at Elisabethville before, during and after the critical 1957–59 period. Their signed statements are unanimous in denying that Wiktor ever prepared a polio vaccine (Bouillet 2001; Fasseaux 2001; Thils 2001).

With regard to the alleged production of polio vaccine by Wiktor, neither his personnel file nor his publications reveal any interest in poliovirus (African Archives 1953–1960). One of us (S.A.P.) knew Tad Wiktor quite well later on at the Wistar Institute where we collaborated on rabies vaccine development, but never did he say anything about having produced polio vaccine. The impression that he never did so is strengthened by the recollections of his wife, Hanka (H. Wiktor, personal communication, 5 October 2000). In addition, Martin Kaplan, formerly of the World Health Organization, visited Wiktor's laboratory in Elisabethville, and remembers that

Tad never mentioned to me that he worked on tissue cultures before he came to Wistar. I visited his lab in Elisabethville. As far as I know he never worked on polio and never mentioned chimp cell cultures (Kaplan 2000).

Huygelen and Mortelmans, who were also familiar with the Elisabethville Veterinary Laboratory, confirm that Tad Wiktor had not worked on polio (Huygelen 2000*b*; J. Mortelmans, personal communication to J.D., 2 November 2000). The inevitable conclusion from the above is that there is a total absence of evidence that chimpanzee kidneys arrived at the two veterinary institutes or that CHAT vaccine was ever produced at those places.

5. INSTITUT POUR LA RECHERCHE SCIENTIFIQUE EN AFRIQUE CENTRAL (IRSAC) AT LWIRO (KIVU, CONGO)

In the course of our investigation, a possible although partial explanation of the discrepancy between Hooper's evidence and that given above emerged. We learned that in 1964, at the Lwiro IRSAC facility, surgery with removal of one kidney was done on a single chimpanzee. This kidney was used to produce cell culture for virological research on infectious hepatitis. The context was a joint project between the Delta Regional Primate Research Center in Louisiana and the IRSAC on several aspects of human infectious hepatitis (IRSAC 1960–1964). William D. Hillis, then at the Delta Laboratory, now at Baylor University, was the physician who removed a single kidney from one chimpanzee and processed it for cell cultures. The objective was to study endogenous viruses of chimpanzees and to attempt to cultivate hepatitis viruses in chimpanzee cells. Hillis (2000) states as follows:

The objective of this work was to make a primary kidney cell culture, to infect the culture with an inoculum suspected to contain hepatitis virus and in future to infect the same chimpanzee and to examine the clinical and laboratory findings.

Hillis adds:

I have no personal knowledge of other nephrectomies in Africa, nor of any chimpanzee work in Rwanda or Burundi.

The experiment was prematurely terminated in August 1964 owing to a local rebellion, which caused the IRSAC staff to flee the country. The cell cultures were never inoculated and soon perished.

The chimpanzee operated on by Hillis was caught by Ursula Rahm (Rahm 1967). Chimpanzee capture was performed in the north-eastern Congo, and care was taken to keep the animals alive while they were transported to the Lwiro facility (Rahm 2000).

These events may or may not explain the memories of some Africans collected by Hooper, but they have no bearing on CHAT virus or the introduction of HIV-1 into humans.

6. H. GELFAND

Hooper also contended at The Royal Society meeting that Henry Gelfand, an epidemiologist from Tulane University who had worked on the CHAT vaccination project, held views on the vaccine lots distributed in the Congo different from our own. Specifically, Gelfand is

quoted by Hooper as saying that the frozen vaccine he picked up in Brussels in August 1958 had been manufactured in Belgium, and that Gelfand thought he had delivered it to Léopoldville, Stanleyville, Bukavu and Elisabethville.

However, Dr Gelfand himself subsequently wrote us the following letter.¹

First, let me state for the record that Mr Hooper ... indicated only that he was writing a book to document the vaccination campaign in Congo, and made no mention of AIDS. This is important because I considered that the source of the vaccine was not crucial to my part of the story (and would be learned from Wistar Institute personnel or records), and I was therefore willing to speculate in answer to questions he put to me and to agree with the possibility of suggestions he made. I repeatedly told him that my memory was hazy and unreliable.

Now for some specific points:

1. I believe that I did not carry vaccine from the United States, but rather picked it up in Brussels. I seem to recall asking Ghislain Courtois if the Public Health Institute in Brussels was manufacturing vaccine, and he said, 'No'. Mr Hooper brought up the possibility of Rega Institute or RIT [Recherches et Industries Thérapeutiques] as manufacturing sources, and I said that I have no knowledge of them; he did not suggest the possibility of Brussels as a depot for Wistar-made vaccine, and I did not think of it. Thus, another laboratory in Belgium remained the speculation. At this time (in the year 2000) I cannot, from personal knowledge, say where the vaccine was made.
2. It is not correct to say, 'Dr Gelfand is unsure, but he believes that he also carried the vaccine onwards to Stanleyville, Bukavu, and Elisabethville'. What is correct is that (as I told Mr Hooper) I am unsure but it is very *unlikely* that I carried vaccine from Leo to other cities in Congo. My mission was to work with the public health people in Leo and then to relay information about that campaign, and vaccine dilution and use, to authorities in other cities.
3. I spoke again with Mr Hooper on 2 September 2000. His statement that I 'also confirmed that this vaccine used in the Léopoldville trial had been prepared in a laboratory outside Brussels not re-iced' is [incorrect]. What I confirmed was that it was not made in Brussels; this does not imply that I *know* that it was made elsewhere in Belgium (Gelfand 2000, his emphasis).

The passage in Hooper's letter which Gelfand decries is given below.

My motivation for writing this book about polio vaccination is to provide an accurate account of an especially fascinating period in the history of medicine—from the perspective of the nineties, when the global eradication of polio is at long last a realizable goal. The history of the vaccination campaign in Africa is particularly intriguing, in that (with the exception of the excellent series of articles about Léopoldville campaign), so little has appeared about it either in the literature, or in the several books which have been written on the subject (Hooper 1996).

As mentioned in the companion paper (Plotkin, this issue), CHAT vaccine was prepared at RIT, but only in 1959, after HIV had infected humans. Only macaque cells were employed, as confirmed by Mr P. Gerardy (2001), who was responsible for removal of the monkey kidneys from the time RIT opened in 1957.

7. EVOLUTION OF SIMIAN IMMUNODEFICIENCY VIRUS IN CHIMPANZEES

During The Royal Society meeting several groups presented genetic modelling data that suggested a time for the beginning of HIV-1 evolution of about 1930. Hooper's counterproposal was that SIVcpz evolved in chimpanzees into the many clades of HIV-1, either in a single elderly infected chimp or in multiple chimpanzees, each conveniently carrying a different clade of the virus. The latter idea appears improbable, as discussed by Sharp at the conference (Sharp *et al.*, this issue). The former idea, however, seemed to us to be testable by examining the evolution of HIV-1 in experimentally infected chimpanzees.

Patricia Fultz of the University of Alabama, who has studied chimpanzee HIV-1 infections over many years, responded to our inquiry with the following letter.

Relative to the chimpanzees infected with HIV-1, the data at hand that are published are as follows. For two chimpanzees infected for 9 and 10 years with LAI, the pairwise differences in the C2-V5 region of Env range from 2.46 to 3.36 and 0.85 to 1.88, respectively. The animal infected 9 yrs when the data were obtained has now been infected for > 12 years.

The most diversity that has been documented is from the chimpanzee that was infected with both LAI and SF2 that died of AIDS. The extent of diversity from LAI ranged from 11.9 to 13.2 and from SF2, 16.9 to 19.5. However, multiple recombination events between the two strains which obscure the strain-specific evolution were identified (Fultz 2000).

As the variation reported by Fultz did not change the clade of the virus, it appears that the evolutionary rate in HIV-1 infected chimps is insufficient to produce multiple clades within a lifetime. Moreover, in the previous article (Plotkin, this issue), we showed that almost all the chimpanzees at Lindi were young animals.

8. ADDITIONAL PCR TESTS

After The Royal Society Discussion Meeting, it came to our attention that Margareta Bottiger had sent samples of lot 10A-11 received originally from Koprowski to the laboratory of the National Institute of Biological Standards and Control in the United Kingdom. Recently, Neil Almond of that laboratory submitted the samples to PCR tests for simian immunodeficiency virus or human immunodeficiency virus and for cell substrate. His results were negative for the former and positive for macaque cell DNA (Berry *et al.* 2001). Thus, these additional results confirm those reported at the conference by C. Basilio (Blancou *et al.* 2001; Poinar *et al.* 2001), to the effect that the vaccine lots used in the Congo and elsewhere were free of retroviruses and were made in macaque cells.

9. AFRICAN WITNESSES TO EVENTS AT CAMP LINDI

Hooper has recounted interviews with former African workers at Camp Lindi, but he seldom gives full names so that those individuals can be identified. His main testimony seems to have been collected from someone named Antoine. We asked D. Akaibe of the University Clinics of Kisangani to interview Antoine Bosongo, Joseph Etimbela and Baelo Alukelo, all former technicians at the former Provincial Medical Laboratory at Kisangani. Parts of

Akaibe's report quoting the three former workers interviewed by Hooper are given below:

Apart from the brain and spinal cord, the researchers collected organs contained in the thoracic cavity. . . . All the cadavers of animals were buried well by the service personnel. All precautions were taken so that no person exterior to the service touched the cadavers. . . . No [chimpanzee] was transferred from the camp before January 1960, when transfer to Léopoldville was decided. . . . (Akaibe 2000).

In answer to the question 'Were organs of chimps from Camp Lindi sent to the United States or Belgium?', the three men responded 'towards 1961, with the agreement of the provincial authorities the animals were sent to the USA via Léopoldville. . . . That put an end to the raising of chimps at the camp.'

Interestingly, Mr Alukelo remembered the Antoine who worked at Camp Lindi, and who was quoted at length in *The river* (Hooper 2001). However, he recalled (Akaibe 2001) that Antoine had died in 1986 or 1987, long before allegedly being interviewed by Hooper in 1999, which leaves open the question as to where, how or whether the interview was done. The younger Antoine, Antoine Basongo, was born in 1950 and never worked at Camp Lindi.

It may be worth noting that in *The river* (p. 840), M. Vandepitte, of the University of Leuven, is accused of having preceded Hooper to the former Camp Lindi outside of Kisangani, and to have muddied the waters. In fact, Vandepitte has not been to Kisangani since 1979 (Vandepitte 2000).

10. SUMMARY

We have made a strenuous effort to examine the new allegations, particularly the two 'smoking guns', but at the end of the investigation there was no gun (the chimpanzees), no bullet (the virus), no shooter (a manufacturer of the vaccine in chimpanzee cells), and no motive to use chimp cells or to hide the fact. The only smoke appeared to be that created by Hooper. The testimony of Bugyaki does not in fact allow the interpretation given to it by Hooper, and the idea that chimpanzee kidneys were extracted at Bujumbura and sent to two veterinary institutes for polio vaccine manufacture has been contradicted both at the supposed source of the animals and at the supposed sites of production.

The results of the extensive investigations summarized here are also worrying because they reveal a modus operandi of Hooper inconsistent with objectivity. Language barrier also may have played a role in his interviews of Africans.

The successive allegations made in *The river* and at The Royal Society meeting have been clearly and definitively refuted by the available evidence. One can anticipate that additional journalistic accusations will appear in the future, but doubtless those will also prove to be farragos.

ENDNOTE

¹Letters cited in this paper will be deposited in the library of the College of Physicians of Philadelphia or the University of Leuven.

REFERENCES

African Archives 1947–1955 Ministry of Foreign Affairs, Brussels. RA/RU 154, Laboratoire de Kisengy.

- African Archives 1953–1959 Ministry of Foreign Affairs, Brussels. Rapport Annuel Vétérinaire. RA/RU 48 (1–7).
- African Archives 1954–1958a Ministry of Foreign Affairs, Brussels. Rapport Annuel RA/CB 220, Direction des Services Médicaux du Congo Belge.
- African Archives 1954–1958b Ministry of Foreign Affairs, Brussels. Rapport Annuel RA/CV 238, Service Vétérinaire du Province de Katanga.
- African Archives 1956–1960 Ministry of Foreign Affairs, Brussels. Rapport Annuel des Services Médicaux du Ruanda-Urundi, RA/RU 52 (1–5).
- African Archives 1957–1959 Ministry of Foreign Affairs, Brussels. Laboratoire de Astrida.
- African Archives 1953–1960 Ministry of Foreign Affairs, Brussels, D.21.235; D.521.RU; D.39.724.
- Akaibe, D. 2000 Report to P. Gigase, 9 November 2000.
- Akaibe, D. 2001 Letter to S. A. Plotkin, 12 March 2001.
- Berry, N., Davis, C., Jenkins, A., Wood, D., Minor, P., Schild, G., Bottiger, M., Holmes, H. & Almond, N. 2001 Analysis of oral polio vaccine CHAT stocks. *Nature* **410**, 1046–1047.
- Blancou, P., Vartanian, J.-P., Christopherson, C., Chenciner, N., Basilico, C., Kwok, S. & Wain-Hobson, S. 2001 Polio vaccine samples not linked to AIDS. A search through the archives clears early vaccines of starting the AIDS pandemic. *Nature* **410**, 1045–1046.
- Bouillet, A. 2001 Signed statement, 14 March 2001.
- Brakel, J. 2000 Statement to D. E. Teuwen, 6 December 2000.
- Bugyaki, L. 2000a Letter to A. Prinzie, 4 February 2000.
- Bugyaki, L. 2000b Extract from translated statement to E. Hooper, 23 July 2000.
- Bugyaki, L. 2000c Translated statement, 6 November 2000.
- Deinhardt, F., Courtois, G., Dherte, P., Osterrieth, P., Ninane, G., Henle, G. & Henle, W. 1962 Studies of liver function tests in chimpanzees after inoculation with human infectious hepatitis virus. *Am. J. Hyg.* **75**, 311–321.
- Fasseaux, P. 2001 Signed statement, 14 March 2001.
- Fultz, P. 2000 Letter to S. A. Plotkin, 30 October 2000.
- Gelfand, H. 2000 Letter to S. A. Plotkin, 23 October 2000.
- Hillis, W. 2000 Statement, 6 December 2000.
- Hooper, E. 1996 Letter to H. Gelfand, 22 November 1996.
- Hooper, E. 2000 *The river: a journey back to the source of HIV and AIDS* (with postscript). Middlesex, UK: Penguin Books.
- Huygelen, C. 2000a Letter to S. A. Plotkin, 19 September 2000.
- Huygelen, C. 2000b Letter to S. A. Plotkin, 7 November 2000.
- IRSAC 1960–1964 Treizième rapport de L'Institut pour la Recherche Scientifique en Afrique Centrale. Direction Générale, Centre de Lwiro, Dépêche Spéciale, BUKAVU, République Démocratique du Congo. Département de Zoologie, Service des Vertébrés Supérieurs. Mammalogie, pp. 63–67.
- Kaplan, M. 2000 Email to S. A. Plotkin, 6 October 2000.
- Lechanteur, F. 2000 Translated statement, 5 December 2000.
- Meyus, H. 2000 Translated letter to D. E. Teuwen, 5 December 2000.
- Osterrieth, P. 2000 Letter to S. A. Plotkin, 15 October 2000.
- Pattyn, S. R. 2000 Letter to S. A. Plotkin, 6 October 2000.
- Poinar, H., Kuch, M. & Pääbo, S. 2001 Molecular analyses of oral polio vaccine samples. *Science* **292**, 743–744.
- Rahm, U. 1967 Observations during chimpanzee captures in the Congo. In *Neue Ergebnisse, der Primatologie/Progress in primatology*, pp. 195–207. Primatological Society. Stuttgart, Germany: Gustav Fischer.
- Rahm, U. 2000 Statement, 6 December 2000.
- Thils, E. 2001 Signed statement, 15 March 2001.
- Van den Abbeele, G. 2000 Statement, 6 December 2000.
- Vanderborgh, H. 2000 Statement, 5 December 2000.
- Vandepitte, M. 2000 Statement, 19 July 2000.
- Yanssen, J. 2000 Translated statement, 22 November 2000.