

## The Gill-Merrill Expedition

### Penultimate Chapter in the Curare Story

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*"To make a great dream come true, the first requirement is a capacity to dream; the second is persistence—a faith in that dream."*

Hans Selye

THE STORY of the discovery of the South American arrow poison, curare, and of its subsequent introduction into medical practice, is one of the most fascinating and romantic in the history of medicine. It is a story which spans more than four centuries, and has been the subject of several excellent books<sup>1-3</sup> and articles.<sup>4-7</sup>

From the time of the earliest tales which came back from the voyageurs to the New World,<sup>†</sup> many different and talented individuals crossed the curare stage, each making his own contribution to the gradual understanding of the drug's mode of action, later development, and eventual clinical use. Some of the names of those involved are household names in medical history, some are better known for their achievements in other fields, while some made their mark also in the history of civilization as a whole. Sir Walter Raleigh, Charles-Marie De La Condamine, Edward Bancroft, the Abbé Felix Fontana, Baron Alexander von Humboldt, Sir Benjamin Collins Brodie, Charles Waterton, François Magendie, Claude Bernard, Harold King, A. R. McIntyre, A. E. Bennett, Harold Griffith, and Cecil Gray are a few of those names.

One of these pioneers, Alexander von Humboldt,<sup>8</sup> forecast in 1807 that an interesting chemical and physiologic investigation of curare would take place when the poisons could be procured without being confounded together from the places where they were prepared. During the course of that investigation, the action and eventually the nature of the drug were dis-

covered, but efforts to harness its muscle relaxant properties met with only minimal and sporadic success because supplies were insufficient, and because the various ingredients were indeed confounded together as von Humboldt had realized. As a result, different batches varied widely in potency, and the small amounts of the crude drug which were obtained were insufficient for biologic standardization.

The penultimate chapter in the long history of curare, which finally opened the door for its clinical use, did not take place until 1938. The full story of this chapter, the story of the Gill-Merrill expedition, is not widely known, and the name of Richard C. Gill is not well-recognized. Apart from Gill's own book<sup>9</sup> and an article,<sup>‡</sup> the story of this expedition has only been recounted fully on one occasion, in *Arrows of Mercy*, Philip Smith's book on the history of curare.<sup>10</sup> However, it was this expedition which brought back the first sufficient bulk supplies of curare from South America, prepared under Gill's observation in the field, and it was this crude curare which subsequently was standardized biologically by A. R. McIntyre, introduced into medical practice by A. E. Bennett in 1939, and later, first used in anesthesia by Harold Griffith and Enid Johnson in 1942.

Thus, the Gill-Merrill expedition was the catalyst for the first consistently successful clinical use of curare, the final link between the jungle and operating room, leading the way to a breakthrough which revolutionized anesthesia and helped open the door to the modern era of surgery. The story, therefore, deserves to be retold, and it is the more fascinating as it contains a personal story of vision and perseverance which fully justifies the words of Hans Selye.

### Biography

Richard Gill was born in 1901 in Washington, D. C., where his father was a local physician. He was expected to follow his father and elder brother into a career in medicine, but after two years of pre-medical studies at Cornell University, the diversity of his interests and his

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† Martyr P: The Decades of the New World. Translated by Eden R. London, 1555.

‡ Gill RC: Black magic and men in white. *Saturday Evening Post* 212:18, 1940.

love of the outdoor life pushed thoughts of medicine aside, and he went off to sea in a tramp steamer, later working for a year on a whaling station in the South Georgia Sea. Returning to Cornell, he studied English in preference to medicine, and graduated with a Bachelor of Arts degree in 1929. He taught English in Pennsylvania, but enjoyed much more his summer employment as a ranger in Yellowstone Park, where his love of the outdoors was by now shared by his wife, Ruth.

Conventional employment did not hold Dick Gill for long, and his wanderlust won again as he took a job as a salesman for a rubber company in South America. Peru, Bolivia, and Ecuador were part of his territory. He and his wife became fascinated by Ecuador in particular. In Ruth Gill's words "they were overawed by the exotic loveliness of the mountains and jungles of Ecuador."<sup>§</sup> She later called it an equatorial Eden. They conceived the idea of starting a ranch where they would ostensibly grow coffee, castor beans, and other plants, but which more importantly, would be a place Dick Gill could use as a base from which to explore the jungle and conduct ethnologic studies of the local Indians. After eight months of searching, they found a site for their hacienda in the valley of the river Pastaza on the eastern slopes of the Andes, and they became both architects and contractors for a baronial type mansion and ranch.<sup>§¶</sup> The house and almost all of its contents was hand-hewn from the surrounding forest with the help of local labor.

During the next three years the Rio Negro Ranch flourished, while Gill became friendly with the local Indians and studied their customs, particularly their use of the jungle pharmacopeia. Among the many drugs he came across, he found the arrow poison, curare, and was able to witness its preparation. He became convinced that many of the jungle drugs could have a place in modern medicine if the correct ethnobotanical field work could be done to bridge the gap between the jungle and laboratory. According to a close friend, he had a unique ability to win the confidence and cooperation of the tribal chiefs and witchdoctors by treating them as intellectual equals within the framework of their highly different cultural backgrounds.\*\* Because he did not patronize them, they sensed his sincerity, and much of his later successful field work was the result of cooperation from the Indians.

Just prior to returning to the U. S. A. for a holiday in 1932, Gill fell from his horse, and he always blamed

the onset of neurologic symptoms which started shortly afterwards to this fall. His illness subsequently was diagnosed as multiple sclerosis, although he never fully accepted that verdict. By October 1934 he had become almost totally paralyzed, and it was during his protracted recovery that his doctor mentioned that the muscular spasms common with multiple sclerosis and associated spastic states might be relieved, if only predictable supplies of curare were available.

These few words were enough for Gill. He had seen the preparation of curare, and had already accepted the value of the jungle medicines. Curare was something that might help both himself and others, and paralyzed or not, he was going back to the jungle to get it. Months of self-imposed physiotherapy followed, as he learned initially to use his fingers and hands again, and later, to walk again on crutches. It took him two years before he had sufficient control of his legs to start driving a car again, and it was four years before he walked back into the jungle with the aid of a stick.

During these four years he planned and trained himself technically for his expedition, picking the brains of doctors, pharmacists, and botanists, and pouring over the literature from every available related field. All who worked with him attested to his talent for studying and retaining technical details from many different specialized areas. He was also fortunate in obtaining financial backing from a wealthy Massachusetts business man, Sayre Merrill, who had read one of the articles that he had written on curare. Finally, all organizational difficulties were overcome, and Gill and his wife left by sea for Ecuador in May 1938.

### The Expedition

Four reels of 16-mm movie film housed in the Arthur E. Guedel Memorial Anesthesia Center in San Francisco exist as a permanent pictorial record of the Gill-Merrill Expedition, supplementing the account in *White Water and Black Magic*. Taken by Gill himself, these films are primarily in black and white, but contain brief patches of early and probably very precious color film where good light and colorful subjects co-existed. The various stages of the trip into the territory of the Canelos Indians in Ecuador, and of their four months of field work are clearly recognizable from the book, and the many difficulties that were overcome are illustrated vividly.

After arriving at the Ecuadorian Port of Guayaquil, the Gills spent three weeks completing final arrangements and supervising the packing of the expedition's equipment to prevent problems expected from the various primitive modes of transportation they were to use, supplies being waterproofed against rain, mud, and river water before they left by truck and later mule train

<sup>§</sup> Gill Mrs RC: Mrs. Robinson Crusoe in Ecuador. *Nat Geog Mag* 65:2, 1934.

<sup>¶</sup> Gill RC: How to be a medieval baron. *Nat Hist* 39:168, 1937.

\*\* Ohlsen V: Personal communication.

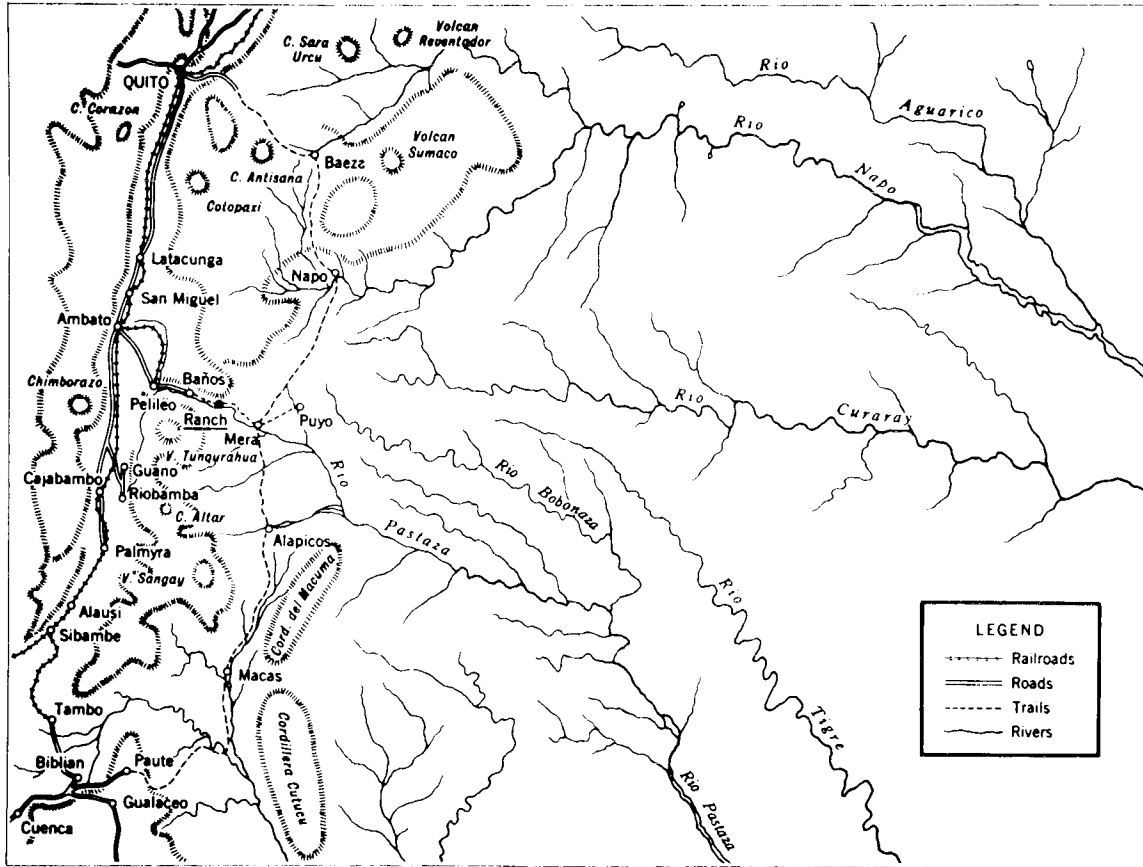


FIG. 1. Map of Ecuadorian Andes, taken from *White Water and Black Magic*, showing the location of the Rio Negro Ranch, and the area of the Gill-Merrill Expedition (see text).

for their Rio Negro ranch. Gill's excitement at their return after the long absence shows clearly in his words "once more it was the ranch, the jungle and the soft rain . . . and very suddenly, I was at ease with the world again."<sup>9</sup>

The years between had seen the ranch partly reclaimed by the jungle, and several days of restoration were necessary before the expedition was ready to start a 3-week journey to the area Gill had selected for their field work, the Pacayacu-Sarayacu region of Ecuador, drained by the tributaries of the Rio Pastaza. At various stages the expedition would consist of the Gills themselves, their senior Ecuadorian field man, Don Manuel, and his assistant, two Ecuadorian camp assistants, 75 Indian porters with four subchiefs to look after their interests, 36 mules, six riding animals, 12 canoes with their own crews, and two tons of equipment. As their leader observed, "it was quite a party."

Heading east from Pastaza Valley through the hilly Andean jungle by mule train, the heavily loaded animals constantly slipped in shallow mud, or became bogged down completely in deep mud, so that loads had to be removed and later replaced once the mules had been

pulled clear; the mules also had to be blindfolded to traverse sideslipping suspension bridges. After three days, they met up with the main body of porters, and loads were transferred for the second portered phase of hard travel through the sub-Andean rain forest (fig. 1). Continually in deep mud and rain, uphill and downhill through deep ravines, each porter carried loads weighing up to 70 pounds. During the last slippery descent of the foothills to the comparative flat beyond, Gill himself had to be helped with a rope down some of the steeper slopes because of his continuing partial instability.

Having broken out of the jungle wall, they reached a village on the Pastaza River system where the canoes were assembled, dugouts varying from 18–25 feet in length, and equipped with bamboo platforms for the cargo. Two of the canoes were fitted with palm arches in deference to the leaders of the expedition. This last phase of their journey gave Gill part of the title for his book, as they navigated countless long and treacherous rapids. At times, loads had to be portaged where the swift waters were judged to be too much even for the skillful navigating of the Indian "bogas," or boatmen.

The rapids were to cause even greater problems on the return journey against the current.

Twenty days from the Rio Negro Ranch, the canoes arrived at a fairly large Indian village, previously selected by Gill.†† Here he now chose a site for his permanent base camp from which he could make radial field trips into the surrounding area, and where he hoped "to see curare being made, learning all I could about its making, and bringing back that knowledge for those who needed it." Not the least important task after their arrival was to cultivate the local Curaca and his villagers; for this purpose they had brought a large and colorful array of trade goods for bargaining and haggling over with great ritual. Land was then cleared and the villagers quickly constructed their base camp—six thatched-roofed bamboo buildings which housed the expedition for the next 4 months, including living and sleeping quarters, a kitchen, office, and makeshift jungle field laboratory. They had to share some of the build-ings with tarantulas, sauba ants, and scorpions, but "managed to live in harmony with them all."

Once settled in, "the place became something of a 3 ring circus for all the Indians of the entire region," and after a slow start, patience paid off, and seven different curare makers arrived at various times to prepare curare in the camp. In Gill's own words,

. . . jungle magic was at its height in making of curare, the flying death. It took time and unending strategy to convince its makers that I already knew something of its magic, and was among them in friendship and with gifts to learn the rest. Later I was able to evolve my own technique of producing an adequate curare unadulterated by superstition and extraneous ingredients, by close observation and documentation of the rituals of procedure followed by the witchdoctors.<sup>9</sup> (See fig. 2.)

In addition to the documentation of these procedures, specimens of every constituent used in the different batches of curare were obtained, identified by their regional Indian name, and prepared for drying and later packing for shipment to the United States. Correct drying was the key to the preservation of good botanical specimens and the expedition had detailed instructions from B. A. Krukoff of the New York Botanical Gardens for this purpose. Prior to their departure, Krukoff had stated in a letter that the botanical constituents of curare, as it was prepared by certain tribes, were still poorly known, and that botanical specimens and a small sample of each species of plant that enter curare would be of considerable scientific interest.

Gill was fascinated by the lore of the poison and of the *brujo* or witchdoctor. He described in detail the

time-honored method of preparation, and the associated taboos, in a novel way with an insight into the mind of the maker.

Meanwhile you have selected a spot for making the flying death far out in the jungle, hidden away from the rest of your people, for that is custom. It is there you store your ingredients as you find them and it is there that you put the especially made clay pots and lay in a supply of firewood that will keep your curare boiling continuously for several days. You must do all that away from your clanhouse and your people. You know that if you made the curare under your own roof all of your household would be weakened and made ill by its magic, just as you know that the people of your household would have a weakening effect on the drug.

You have built a lean-to, for you will continue your vigil as a poison maker alone and away from the world for several days. During that time you cannot be with or even—it is better—see your wife; and in your retreat you are happy in the knowledge that the one thing in all the jungle which would most weaken your poison cannot happen: no pregnant woman will come within sight of your pots of boiling poison. If that should happen, you might as well throw the stuff away, for you know that it would be weak and useless. . . .<sup>9</sup>

In a similar vein, the preparation of the fires and plants is detailed, and the simmering of the juices for two days and nights as they slowly evaporate down to their final tar-like consistency, down to the final moments in the process of the making of the flying death.

While the hot black stuff is simmering down to about the volume of a pint, it must not be allowed to scorch. Guarding your hand with a thick green leaf, you anxiously remove individual embers from the fire or, if you think best, shove them close to the pot and blow gently on them. It is your only means of temperature control in the most nerve-racking procedure in all the jungle . . . and the most exacting work which you, a jungle man, will ever have to do. . . . as the afternoon wears on, and the poison looks more than ever like melted pitch, you commence to touch its surface with the tip of a blow gun arrow. Suddenly, one of the times you touch it, a long sticky black thread rises up behind the arrow's tip. It has come to its "point."

Quickly you lift the little jar from the jar, and before it has time to cool and harden, you pour the thick black syrup into a gourd or long thin tube of bamboo. . . . As soon as it has congealed, you carefully cave the mouth of the container with a bit of leaf which you size down with a thread of pita fiber. You have finished. . . .<sup>9</sup>

Apart from the curare, Gill explored a vast number of possibilities for the jungle pharmacopoeia. He brought back approximately 75 different botanical specimens from which various drug preparations were made by the Indians. He was to be sadly disappointed by the lack of commercial interest in these other areas, which included cosmetic and dermatological remedies, narcotics, a contraceptive, an abortifacient, an insecticide, and primitive malarial prophylactics.

After 4 months in their jungle camp, the Gills were satisfied with the results of their collections, and all the specimens were packed carefully for the return journey.

†† Gill never gave the exact location of his jungle base camp, probably because he was concerned regarding the future commercial supply of curare samples.

FIG. 2. Richard Gill watching the preparation of curare during the Gill-Merrill Expedition, Ecuador, 1938. Steam can be seen rising from the simmering curare pot in the foreground.



Included in these specimens was 25 pounds of crude curare, by far the largest single amount brought out of South America at that time. When they arrived in the United States at the end of 1938, the field notes written by Ruth Gill,‡‡ together with all the curare specimens, were turned over for detailed study by B. A. Krukoff at the New York Botanical Gardens. Krukoff<sup>11</sup> confirmed that as was true with other South American tribes which prepare curare, the same main ingredients were used by all the Canelos poison makers, with variations only occurring in quantities and secondary ingredients. Gill's specimens included the two main families of plants in which the curare lianas occur, the Menispermaceae including varieties of the genus *Chondodendron*, and the Loganaceae including the genus *Strychnos*. The Menispermaceae were predominant in the Canelos poisons, in conformity with the more western prevalence of these lianas, with the three main ingredients being *Chondodendron iquitianum*, *Chondodendron tomentosum*, and *Sciadotenia toxifera*. *Strychnos toxifera*,

a primary ingredient of the poisons of other tribes, although identified in one of Gill's specimens, was not considered by the Canelos as an essential ingredient, as their poisons were often prepared without it. The Canelos believed that *C. iquitianum* was the most important of all, and that the arrow poison could be made from it alone.

The first few months back in North America were both disappointing and frustrating for Gill; apart from the lack of interest in his other remedies,

For some time it was discouragingly difficult to find a reputable manufacturer who was willing to accept the new field evidence, and to pioneer the refinement and biological standardization of the curare.<sup>9</sup>

However, the neurologist who had treated Gill during his illness discussed the availability of the curare samples with a friend, A. E. Bennett, who was Professor of Neurology and Psychiatry at the University of Nebraska. Bennett arranged for his colleague at Nebraska, A. R. McIntyre, to undertake biologic standardization of the crude curare, and then began experiments in cases of spastic paralysis. Other researchers<sup>12,13</sup> had been using curare in this type of case during the 1930s, but had been discouraged by the unpredictability of the avail-

‡‡ After her husband's death in 1958 these notes, together with the films of the expedition and personal curare mementoes were donated by Mrs. Gill to the Arthur E. Guedel Memorial Anesthesia Center, now located at 2395 Sacramento Street, San Francisco, California.

able supplies. Thanks to McIntyre's work, Bennett now found that he had a more predictable product, but he confirmed the earlier work that the temporary improvement produced was never sustained.

By this time, Gill's curare had been given to the Squibb Company, where H. A. Holaday devised the more sensitive rabbit head-drop test for biologic assay, and named the new drug Intocostrin.<sup>8</sup> Bennett had earlier conceived the idea of using the drug to modify the convulsions of metrazol-induced shock therapy. By November 1939 he was able to write to the drug company, "I think we have made a ten strike in the use of curare," and his paper describing the prevention of the traumatic complications which earlier had threatened to cause abandonment of this type of procedure was presented the following year.<sup>14</sup>

In January 1942, after a suggestion by Lewis Wright, Harold Griffith in Montreal began to use Intocostrin to produce muscular relaxation in patients undergoing general anesthesia, and six months later, he and Enid Johnson published their classic paper, closing with the simple statement

... we have been so impressed by the dramatic effect produced on every one of our patients that we believe this investigation should be continued.<sup>15</sup>

The investigation did proceed, completely fulfilling von Humboldt's forecast of more than a century before. Stuart Cullen<sup>16</sup> and others followed up on Griffith's work, and within a few years, the use of curare was established firmly not only in anesthesia, but also later in the new and expanding discipline of intensive care medicine. Over four hundred years had passed since the earliest description of the poisoned arrows, but the wheel finally had turned full circle, and the arrows had found their true mark.

### The Role of the Expedition

To make a proper assessment of the role played by the Gill-Merrill Expedition in the story of curare it is necessary to review briefly some of the early work done with the drug, and to consider the progress which had been made by the mid 1930s when the expedition was conceived.

Following the work of Sir Benjamin Collins Brodie in 1811-1812,<sup>17</sup> and the famous experiment with a she-ass performed by Charles Waterton, William Sewell and Collins Brodie in 1814,<sup>18</sup> the value of artificial respiration in overcoming the effects of the poison was gradually accepted. Soon after his classic work demonstrating that the site of action of curare lay at a point of junction between nerve and muscle,<sup>19</sup> Claude Bernard was able to state didactically:

Artificial respiration can be easily applied in man and apparatuses to accomplish it exist. If a man were poisoned by curare the only

known way to save him would be by making him breathe artificially.<sup>20</sup>

Because its action in relaxing muscle was understood, even long before Bernard's work, it was natural that efforts should be made to use curare in the treatment of hydrophobia and tetanus, and animal experiments carried out by William Sewell were at least partially successful. §§ It was not until 1858, however, that an attempt was made to treat tetanus in humans with curare.<sup>21</sup> By the following year, despite the support of Bernard and his fellow physiologist, Flourens, many argued against the practice, and in reviewing nine cases, an editorialist made this succinct summary: "Its chemical nature is not uniform, even its source is variable, and its energies are unequal in various specimens."<sup>22</sup> Here indeed was the crux of the matter, which together with the scarcity of the poison, was to hinder progress for a further 80 years, although cases of tetanus continued to be treated sporadically with some limited success.

In 1912, Arthur Læwen made the first suggestion that curare could be used to overcome the rigidity of the abdominal wall during anesthesia.<sup>23</sup> However, he was forced to admit:

Unfortunately there is not sufficient curare available at the moment so I have not yet been able to ascertain the correct dose for the purpose.

Læwen's work did not attract much interest and he did not pursue the matter further.

There was a re-awakening of interest in the 1930s and Harold King<sup>24</sup> in 1935 isolated the pure alkaloid *d*-tubocurarine from a museum specimen of curare. Cole,<sup>25</sup> using a 20-year-old specimen, and later Ranyard West,<sup>26</sup> treated cases of tetanus, and West also in Britain<sup>13</sup> and M. Burman in the United States<sup>12</sup> worked with cases of spastic paralysis, with disappointing temporary and unpredictable results. Supply continued to be one of the limiting factors, and in 1946, West wrote to Gill that failure to finance an expedition beyond British Guiana was the reason for his not going on in 1936. By 1938 in North America, the Merck Institute, who had supplied Burman with his curare samples, also had dropped their investigation of the curare lianas.<sup>10</sup>

Thus, in 1938 curare was in a unique position. Its action was fully understood, it had been used in the laboratory in animal experiments and in humans for over one hundred years, yet supply and predictability were still a complete barrier to further progress. There matters might have stood had it not been for Richard Gill. In 1934, as he lay paralyzed in New York, he had pondered the questions:

§§ Travers B: A Further Enquiry Regarding Constitutional Irritation. London, 1835, p 308

If only there were enough of it in the civilised world to enable it to be standardised biologically so that safe doses could be gauged. If only batches didn't vary in potency. If only . . .<sup>27</sup>

Gill was a layman, with a medical background and interest, and considerable local knowledge of Ecuador. He did not initially visualize the use of curare in medicine beyond its possibilities in spastic states, but he did know that sufficient quantities were required in order to standardize the drug for clinical use. He also had an intensity of purpose that never wavered, keeping his goal in sight for four years, despite his physical problems, and equipping himself technically for his self-appointed task.

It is difficult to speculate how long a delay might have occurred had the Gill-Merrill Expedition not taken place, but it would certainly have been measured in years. Cecil Gray, who, with John Halton, introduced the pure alkaloid *d*-tubocurarine into anesthesia,<sup>28</sup> believes that the timetable would have been affected quite seriously had Gill's curare not become available.¶¶ The new drug application for Intocostrin was not submitted to the Food and Drug Administration for approval until April 1943.<sup>19</sup> Had this date been set back significantly, any delay would have been compounded as time passed by the increasing concern of the regulatory bodies on both sides of the Atlantic over the uncontrolled use of new drugs. In fact, before long, the early workers in the field might have come under very serious criticism for the rapid clinical application of such a powerful drug,¶¶\*\*\* with immeasurable consequences for both the medical use of curare and the advances which this use brought in its train. Gray also confirms that his own work with *d*-tubocurarine would not have been undertaken in the absence of the stimulus of the use of Intocostrin by Harold Griffith.

When Gill died in 1958, he died a disappointed man. Disappointed because he felt his claim to have been responsible for the introduction of the first clinically adequate curare had not been recognized fully, and because he had been passed over in the major commercial development of the drug. Although he was subsequently able to develop his own process for extraction of pure *d*-tubocurarine, and successfully supplied and exported the drug, he was perhaps naive in his expectations of involvement with the major manufacturers. His other disappointment was his failure to market a slow-acting form of curare which he had long hoped would have a significant role in spastic disorders.

A depreciatory view of the value of Gill's contribution has been given in part of a wider survey of the many drugs derived from plants.<sup>29</sup> Starting from the assertion that everyone interviewed in connection with Gill re-

acted strongly to the mention of his name in either a very positive or very negative way, the author then gives two examples of only the negative view. With the exception of Krukoff, there is no mention whatsoever of anyone who worked and corresponded with Gill during the development of the drug. In addition, speculation that Gill's book could have been largely fictional is left half unanswered, whereas viewing of the films of the expedition and a close reading of the book totally refute such a suggestion.

The other correct view of the value of Gill's work is evident from the full story of the expedition and the time scale in which it took place, and can be confirmed from many sources. A. R. McIntyre,<sup>5</sup> Bryn Thomas,<sup>30</sup> and Philip Smith,<sup>31</sup> are unanimous in emphasizing that it was Gill's energy and enterprise that were responsible for bridging the gap between the jungle and the operating room, while in *The Flying Death*, a collection of classic papers and commentary on curare, the authors conclude that "the final steps in the medical 'civilising' of curare could not have been taken without someone the likes of Richard Cochran Gill."<sup>32</sup>

Apart from McIntyre, the other two principals in the final chapter of the development of curare leave little doubt in their published and unpublished comments that they believed Gill's work should be recognized more widely. In 1965, A. E. Bennett donated all his correspondence with Gill from 1939 to 1942 to the Guedel Memorial Anesthesia Center, and in making that donation, he wrote that he was preparing an authentic history of the investigation into curare as an acknowledgment of Gill's contribution for which he felt Gill had never been adequately credited. The published article<sup>6</sup> was dedicated to Gill's memory. Harold Griffith shared this view,<sup>33</sup> and it is perhaps fitting that the last words should be left to the man who pioneered the use of curare in anesthesia. Writing to Gill in 1943, he said

I believe that your work with curare has been a great contribution to modern medicine. . . . I should like to express the very great appreciation of our surgeons, anaesthetists and patients for the very useful work you have done in making the drug available to us.

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