The LES Yankeetech License Game

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and

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YANKEETECH GAME

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Rules for Playing the YankeeTech Game

1. All participants must be given an opportunity to study the background memorandum before attending the session at which the game is to be played. Ideally, the game should be played over a period of two days, with participants having an opportunity to discuss their strategy and prepare any documentation the night before the negotiating sessions (spending about 3 hours in preparation), with the actual negotiations taking place the following morning, (with an additional duration of about 2-1/2 hours).

2. Assuming a pool of about 30 people, the participants should be divided into separate sections, each with 15 participants. Within each section, three teams should be chosen at random, each of equal size. They should represent, respectively, YankeeTech Corporation, Jackson Industries and Hemoglobal.

3. Each team should make its preparations for the negotiations, charting a strategy and identifying its necessary, important, and less important objectives. Persons should be chosen by each team to act as the negotiating leader, the chief technical officer, chief marketing officer, chief financial officer, and attorney.

4. The head of the YankeeTech team should be requested whether it is desired to meet initially with either Jackson Industries or Hemoglobal. When the choice is made, YankeeTech should meet with the selected company. The initial negotiation should last for 30 minutes, with the time strictly enforced. Auditors should not comment about the progress of the negotiation, but should take notes, which should be used for criticism and commentaries later during the wrap-up. Indications should be given to the participants when half the time has elapsed, when 10 minutes and when 5 minutes are remaining.

5. At the end of the session, the invited team should withdraw and YankeeTech should have 10 minutes to assess the results of the negotiation, and perhaps alter its strategy in light of the presentations that have been made.

6. The other team (either Jackson Industries or Hemoglobal) should then be invited for a 30 minute negotiating session. The auditors should behave in the same manner.

7. At the end of this session, YankeeTech should again have 10 minutes to assess the results, and to make possible adjustments to its strategies.

8. The first invitee should then come back for a 2nd negotiating session of 15 minutes duration.

9. At the end of this session, YankeeTech should have 5 minutes to assess the status of the negotiations and to make further plans.

10. The other team should likewise return for a 15 minute negotiating session.

11. At the end of the 2nd round, YankeeTech should have 10 minutes to decide whether it wishes to invite either of the other two teams back for a 3rd session. Only one of such teams can be eligible for such session, which should last for no longer than 10 minutes. The main purpose of this final session is to button up certain outstanding points, or make final concessions. It may also be used to inform the invitee that YankeeTech has chosen a strategy involving the other company, but wishes to explain this personally to the invitee since there may be an occasion in the future for the parties to do business together.

12. Following the close of the final negotiating session (the 5th such session) all of the participants from the various sections should reassemble. Assuming, for example, that there have been two sections of 15 persons, representatives of YankeeTech from the first section should report to everyone the outcome of their negotiations and various observations which led to such result. Different members of the team should be invited to give their reports as to their objectives and the way in which matters worked out.

13. Following this, the chief negotiator and other members of the teams of Jackson Industries and Hemoglobal should likewise report to the entire group about their initial strategies, adjustments that were made in the course of the negotiations, and their sense of satisfaction or disappointment at the outcome.

14. Following this, the auditor of this group should provide comments about the quality of the negotiations, suggestions of changes that might have been made, as well as congratulations for matters adroitly executed.

15. Once the first section has completed its report, the second should likewise make a report to the entire group, in order that the first section can compare its strategies and results which those achieved by its peers in the second group, working entirely independently. If more than two sections have been selected, a third should then also report to the group in the same manner.

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This negotiation has been conducted about fifty times during a course given several times each year under the auspices of The Center for Professional Advancement. The title of the course is "International Licensing and Strategic Partnering for the Technology Manager." There has been no uniformity in the results, and a number of different, and indeed highly imaginative, outcomes have been achieved. The skill of the negotiators, their creativity and the thoroughness of their preparation have been found to be the crucial elements that have led to satisfying outcomes. If one or more of these negotiating teams in each section has not "done its homework," this can diminish the value of the exercise for all concerned.

The game has also been played at several LES conferences and at two American universities. It is based on an actual situation, and its original form was as a case at the Harvard Business School.

Several improvements to the game have been made in this 1997 version. Many of them reflect suggestions by former participants. These contributions have been welcome and much appreciated.

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Robert Goldscheider

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YankeeTech Corporation

In January of 1995, John Zamboni, President of YankeeTech Corp., was ready to launch an ambitious program. Five-and-a-half years before, YankeeTech had been awarded a patent on a novel blood filtration technology which separated blood plasma from whole blood. The patent claims had recently been confirmed following reexamination. Mr. Zamboni wished to generate revenue from the technology before expiration of the patent in 11-1/2 years. Should YankeeTech produce and market products in-house, form a joint venture with a partner, and/or license the technology to other manufacturers? These issues were carefully discussed by a team of senior YankeeTech executives.

BACKGROUND

YankeeTech, a Boston-based company, was founded in 1985 by a professor of chemical engineering and some of her former students, including John Zamboni. Originally, YankeeTech concentrated on performing contract research for industrial clients, usually on a joint venture basis, retaining an ownership interest in all technologies it developed. Pursuant to these arrangements, resulting products and processes outside the client's field of interest could be manufactured by YankeeTech or licensed by it to other companies.

In 1991, YankeeTech's profits pretax profits exceeded $2,500,000 on sales of over $21 million. Since then growth had averaged 22% per annum and Mr. Zamboni confidently expected revenues to reach $45 million by 1996. By the close of 1991, over one-third of YankeeTech's sales were to customers located outside the continental United States.

YankeeTech's Ultrafiltration Membrane Technology

YankeeTech was involved in two quite different types of blood filtration applications: the separation of blood plasma from whole blood, and the removal of toxic molecules from blood. Both of these applications had been developed as an outgrowth of research on ultrafiltration membranes, which was the main business of YankeeTech's Scientific Systems Division(SSD).

SSD sold two types of products: disposable ultrafiltration membrane filters, which were basically thin plastic films with pores, and the laboratory equipment in which the membranes were placed. The ultrafiltration membranes had been developed by YankeeTech in the late 1980s, as a result of contract research financed in part by the Warren-Golden Corporation; they enabled molecules of size 10-150 Angstroms[1] to be

[1]Angstrom is a unit of length membrane. One Angstrom is equivalent to 0.00000001 cm.

filtered successfully for the first time. Thus, for instance, water and salt molecules, whose size were less than 10 Angstroms, could pass through an ultrafiltration membrane, but viruses, enzymes and protein molecules, which were over 10 Angstroms in size, could not.

Use of ultrafiltration membranes fulfilled two functions: first, a solution containing extraneous large molecules could be cleansed of these impurities and; second, protein and other biological molecules could be obtained in a more concentrated form.

YankeeTech's agreement with Warren-Golden specified that Warren-Golden could use the new technology to manufacture products for industrial applications, whereas YankeeTech was free to manufacture and sell products to the research laboratory market. Each firm paid the other royalties on the basis of 5% of ultrafiltration membrane sales, but not on sales of the associated equipment which each of the companies made.

YankeeTech sold its ultrafiltration membrane products to the life science and medical research laboratories of universities, and pharmaceutical companies for a variety of research applications. Such sales accounted for over 75% of the world markets for ultrafiltration membranes and associated laboratory equipment in research laboratories. Currently almost 50% of parts, as well as all ultrafiltration membranes, were manufactured in-house at YankeeTech.

Blood Filtration for Toxic Removal

A notable recent technical breakthrough by YankeeTech concerned the removal of toxins from blood, a function usually performed in the human body by the kidneys.

Virtually all artificial kidneys currently in use worked by means of dialysis, in which the patient's blood flowed in a continuous manner on one side of the membrane and a wash fluid flowed on the other side. During the process, toxins in the blood traveled through the membrane and were carried away in the wash fluid, while the cleansed blood was returned to the patient. Although semi-weekly artificial kidney treatments were sustaining 400,000 patients worldwide, the treatment did not fully duplicate the kidney function, and had certain undesirable side effects for many patients.

YankeeTech's potential breakthrough was the development of ultrafiltration membranes which allowed the blood to be filtered in a manner closer to that of an actual kidney. The YankeeTech process seemed to lessen side effects for the patient while more fully simulating the function of a kidney, perhaps because larger toxic molecules could be removed than in conventional dialysis.

In early 1994 the use of YankeeTech's ultrafiltration membranes for blood cleansing was being tested clinically to generate date on the safety and efficacy of the process for submission to the U.S. Food and Drug Administration (FDA). FDA approval

was required before the YankeeTech device could be manufactured in the United State and sold commercially, either in the U.S. or abroad. However, interest from Western Europe, particularly Germany, had been so enthusiastic that YankeeTech was building a plant in Ireland to service the European market.[2] Government approvals were also required in most countries outside the U.S., but their requirements were considered to be less strict, and could be completed more rapidly.

Separation of Blood Plasma from Whole Blood

YankeeTech's development of filtration technology for separating blood plasma from whole blood was a direct result of solving an existing problem in ultrafiltration technology: the build up of a filter cake on the membrane surface, which reduced efficiency by reducing the flow rate through the membrane. YankeeTech's scientists developed a method for flowing the solution to be filtered through thin channels in a direction parallel to the membrane to ensure continuous circulation on the membrane surface; this alleviated the build-up problem.

Having developed an effective parallel-flow technique in ultrafiltration, YankeeTech scientists investigated the possibility of employing the same technique in other types of filtration. In particular, they investigated **micro filtration**[3], the filtration of molecules in the size range 4,000-6000 Angstroms, molecules much larger than the 10-150 Angstrom size range for which ultrafiltration was appropriate. When whole blood was filtered by the YankeeTech process over a micro filtration membrane, blood plasma was successfully separated from whole blood, with the plasma passing through the membrane and blood cells being retained. Previous to the application of YankeeTech's parallel-flow technique, it had been impossible to separate blood plasma from whole blood by a filtration process without rupturing the blood cells, which then contaminated the plasma.

On the basis of its discovery, YankeeTech applied for a patent on a new apparatus process for the separation of blood plasma from whole blood, and in June 1989, the United States Patent office granted the patent number 4,905,100 which protected YankeeTech's discovery. YankeeTech was subsequently granted patents on the invention in Canada, Japan, France, Germany, Switzerland, Italy, and Sweden, in addition to the United States.

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[2]Of approximately 20 centers which were sustaining a total of 120 patients without normal kidney function worldwide, 85% were located in Europe and 15% in the United States.

[3]Although the production of ultrafiltration membranes was limited to YankeeTech, and Warren-Golden Corporation, since the original patents were still in force, the production of micro filtration membranes was not controlled by patents, and they were available from many suppliers.

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A key advantage of the YankeeTech filtration system over existing technology was the continuous nature of the filtration process, unlike the existing process in practice which involved several stages (blood collection from the donor; whole blood placed in a centrifuge where blood plasma is separated from blood cells; plasma removed; blood cells returned to donor). Use of the YankeeTech system permitted whole blood to be withdrawn from the donor, filtered to remove the blood plasma, and returned, all in one continuous operation.

Because it had never been possible, despite a history of attempts, to separate blood plasma from whole blood using micro filtration membranes and conventional filtrations processes, industry and government funding agencies were skeptical about the practicality of the YankeeTech process. However, as a result of a study funded by the National Institutes of Health (NIH)[4], researchers at the American National Red Cross, which was actively promoting the concept of blood-plasma collection by filtration, had concluded that YankeeTech's process claims were justified. The Red Cross subcontracted a portion of this study to YankeeTech, and two new patent applications, generally known as improvement inventions, were filed in early 1994.

One of the patents, co-authored by the Red Cross and YankeeTech, specified the exact conditions under which a commercial-sized plasma separation system would have to operate. The second patent, solely authored by YankeeTech, specified a particular filter design which would allow blood plasma separation in commercial quantities. Since NIH had funded the study which gave rise to these patents, the U.S. Government would have a royalty free license to the patents, but YankeeTech was otherwise free to commercialize them as it saw fit. For an optimum commercial system to be manufactured and used, all three patents (including YankeeTech's Patent No. 4,905,100) would likely be required.

Mr. Zamboni saw four major applications for which the separation of blood plasma from whole blood might offer considerable benefits: human blood plasma collection, blood plasma analysis, blood plasma therapy, and animal blood plasma collection. Of these applications, human blood plasma collection offered the greatest immediate potential.

Human Blood Plasma Collection - Background.[5]

In 1994 the United States led the production and distribution of blood plasma fractions, a series of natural drug products which were obtained by secondary processing of human blood plasma.[6] Sales of blood plasma fractions by United States organizations in 1993 were estimated at $880 million and were 95% of total world volume. Approximately 20% of this amount was exported.

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[4]A division of the U.S. Department of Health.

[5]Much of the data for this section was obtained from an article in Business Week, September 11, 1978; all dates have been extrapolated forward for the purpose of this exercise.

[6]Any particular blood plasma fraction consisted of a defined molecular weight range of protein molecules.

There were two systems of plasma collection in operation: in the first system, whole blood was obtained from unpaid donors. Once per month maximum, donors each gave one-half liter of blood, which was then either distributed to hospitals or sent to contract processors who separated the blood plasma and then extracted the blood plasma fractions. From one-half liter of whole blood, 300 milliliters of blood plasma could be obtained.

Blood plasma collection and distribution were dominated by the American Red Cross, which accounted for over 50% of voluntary blood donations, with hospitals and independent blood collections accounting for the remainder. The Red Cross has paid contract processors $36.4 million for blood plasma fractions in 1987, which it has then sold for $117.6 million.

In the second system, whole blood was obtained from paid donors, for the specific purpose of collecting blood plasma. In this system, after one-half liter of blood was removed from the donor, it was immediately centrifuged and the blood cells returned to the donor. The effect of this procedure was to allow a second half-liter of blood to be removed and processed exactly the same way immediately after the first half-liter. This single two-hour session would yield approximately 575 milliliters of blood plasma.

The typical commercial blood plasma collection center collected 10,000 liters of blood plasma annually, the range being 3,000 to 20,000 liters. Independent centers sold blood plasma either under long-term contracts for between $67 to $70 per liter, or in the spot market at between $70 and $75 per liter. Approximately 65% of the commercial centers were independent operations, 20% owned and operated by Maynard-Smith Corp. and 10% by Jackson, Inc.

Both Maynard-Smith and Jackson were involved in other aspects of the blood collection and processing industry. Maynard-Smith produced disposable blood collection kits, which it supplied to its own plasma collection centers, as well as processing blood plasma into blood plasma fractions.

Jackson, Inc. a $3.5 billion company, also produced disposable blood collection kits, holding a 90% share of kits sold to the independent plasma collection centers, the Red Cross and other centers which collected whole blood. It was also a major plasma customer of the independent blood plasma collection centers and the major contract processor for the Red Cross and other voluntary blood collection organizations. Its business was concentrated in the U.S. and Canada, but it had recently licensed in technology from Japan.

APPLICATIONS FOR THE YANKEETECH PROCESS

Human Blood Collection

Mr. Zamboni believed that the YankeeTech filtration process offered benefits to both the commercial plasma collections center and voluntary blood collection agencies. The critical feature of the process, continuous filtration, permitted plasma to be collected directly from a donor while the blood cells were simultaneously reintroduced to the donor. In this manner, 625 milliliters of blood plasma could be collected in a 45-minute session.

The YankeeTech process offered voluntary collection agencies the possibility of direct blood plasma collection, which had previously been considered unfeasible because of the unreasonably long two-hour donation session required by the centrifuge technique. Furthermore, the YankeeTech systems yielded over 600 milliliters of blood plasma in a single session. Finally, blood plasma collection potential would be significantly increased since donors could provide total plasma much more frequently.

To the commercial plasma collections centers, the YankeeTech continuous system offered elimination of any possibility of the donor's receiving another donor's blood cells; although there were very careful checks in the present system, there was always the possibility of a mistake. This factor is considered to be particularly significant because of the dangers of AIDS and hepatitis. Also, the time savings would increase the capacity of a blood collection center and reduce donor inconvenience.

On the other hand, the cost to the collection centers of disposable items would result in the net increase from $22 to $34 per application. The difference would be partially offset by a $8 to $12 labor cost savings. In addition, centers would also have to purchase electronic control systems (one per bed), to monitor blood flow rates. However, Mr. Zamboni considered that the cost of these systems would be made up for by the fact that centrifuges would no longer be required.

The overall attraction of increased safety and shorter plasma collection times, versus higher total costs for disposables, was subject to much debate. Some industry representatives had told Mr. Zamboni that plasma collections centers would happily pay the higher cost to gain increased safety and shorten donation time; others said that the low profit margins of the collection centers would make it impossible for some centers to pay the added cost.

Mr. Zamboni estimated that if all commercial collection centers in U.S. adopted the YankeeTech process, there would be an annual requirement for twelve (12) million micro filtration membrane units; further, should the Red Cross and other voluntary organizations convert a significant proportion of their whole blood collection programs to blood plasma collection, there would be a considerably increased demand for micro filtration units from that sector.

FDA approval was necessary before the YankeeTech process could be used commercially in the United States, but no such impediment existed for sales to overseas markets, provided that the units were manufactured abroad. Mr. Zamboni believed that there could be substantial overseas demand.

The sales potential for the YankeeTech process had recently been confirmed in a confidential study issued by an investment group, which estimated that in 1996, 6.8 million micro filtration units could be sold worldwide, half in the U.S. and half in Europe.

Human Blood Plasma Analysis

Many blood analyses were more efficiently carried out on blood plasma than on whole blood. Under the present system, samples of blood were drawn from a patient and centrifuged in a laboratory to obtain plasma. Mr. Zamboni believed that the small quantities of plasma required for analytic purposes could be obtained more efficiently using the YankeeTech technique. The advantages of the technique to hospitals, clinics and physicians promised a potentially substantial demand, particularly because the technique can be automated relatively easily. Although FDA approval would also be required for this application, less testing was required of diagnostic devices than that for medical devices.

Human Blood Plasma Therapy

Many blood disorders required hospital treatment or replacement of blood plasma. In the current system, blood plasma was separated from the donor's whole blood by centrifuge, treated by exposure to enzymes or other active chemicals, recombined with blood cells, and reintroduced; or the patient's own plasma was discarded and his blood cells, combined with donor-supplied plasma were then reintroduced. The YankeeTech separation technique would permit the whole process to be performed continuously in either case, considerably reducing both treatment time and patient trauma.

In addition, recent clinical tests had proven a link between blood plasma therapy and the retardation or remission of the progress of the AIDS virus by use of certain enzymes. This had received attention in the press, and it was believed that special research funds might be obtained from outside sources to help finance accelerated work in this area.

Commercial development of the blood therapy application was considered many years in the future, since much more research was necessary and FDA approval would again be required. However, it was considered that the potential market could be considerable, and that hospitals would be the major customer group. In addition, because it had potential benefits in the treatment of AIDS, FDA approval would probably require considerably less time than is normally the case.

Animal Blood Collection

A final application for YankeeTech's blood plasma separation process had been identified in an industry developed for the productions of antibodies were grown in sheep, pigs and goats housed in farms devoted entirely to antibody production. The antibodies grew in the animal's blood plasma, and periodically the animals were bled and the plasma collected by centrifuge.

YankeeTech's continuous process could offer considerable benefits to farm owners, who indicated that they were willing to pay a high price for a working system. The antibodies could also be useful to combat a variety of human diseases, but such applications would be subject to FDA regulation. In veterinary applications, it was possible that filtration devices could be sold in the U.S. without FDA approval.

STRATEGIES FOR CONSIDERATION

With each of the four fields of use (Human Blood and Blood Plasma Collections; Blood Plasma Analysis; Blood Plasma Therapy; and Animal Blood Plasma Collection), Mr. Zamboni was faced with determining which was most promising for purposes of directing YankeeTech's market development efforts. Then it would be essential to choose among strategies; direct entry, joint ventures, licensing, etc.

Human Blood Plasma Collection

The large potential market for human blood plasma, together with anticipated growth, made direct entry, which would include manufacturing and selling the filtration units, a tempting proposition. Since YankeeTech would be protected by its patents for another 11-1/2 years, it could build a dominant position by 1997. On the other hand, this would require YankeeTech to perform the engineering development work necessary to turn its laboratory prototype filtration units into full-scale commercial products. It would also have to set up a production line to manufacture high volume, lowcost plastic parts.[7] Further, outside plastics engineers would be required to design the molds.

[7]Plastic materials used for this purpose would have to meet medical grade specifications. These materials were particularly difficult to mold.

Mr. Zamboni felt that YankeeTech could probably purchase the microfiltration membranes from an outside supplier, but would have to set up two assembly operations: one to construct filtration units from the membranes, and then combining these with auxiliary plastic tubing sets to produce blood plasma collection kits.

He estimated the total capital cost at $3-$5 million, although a small scale operation might be put in place for only $750,000. Finally, a sales force and service operation would have to be developed. The cost to YankeeTech of each sales or field service representative was approximately $100,000 per year, $60,000 for compensation and $40,000 for travel and expenses. Mr. Zamboni estimated that five salespersons, a sales manager and three service technicians were the minimum required for the U.S. market. If YankeeTech did enter directly, it was estimated it could obtain sales revenue of $30 for a blood plasma collection kit, while the direct manufacturing cost would be approximately $15.

Mr. Zamboni was unsure how Maynard-Smith and Jackson would react to YankeeTech's entry. Since Maynard-Smith produced all of the tubing sets and collection vessels for its own blood collection centers, it might be unwilling to purchase completed kits from YankeeTech. Furthermore, YankeeTech in these circumstances would be competing head-on with Jackson, who currently supplied the disposable kits to the majority of the market. An even more critical consideration was that YankeeTech's direct entry into the blood plasma collection market would almost certainly stimulate efforts by Maynard-Smith and Jackson to "turn around" the YankeeTech patent and develop their own filtration device. YankeeTech was therefore wary about operating in this type of competitive market.

A second alternative was a joint venture, but Mr. Zamboni was unsure whether YankeeTech's patent by itself was sufficient for a joint-venture partner to be interested. Furthermore, there was a choice of whom to approach for a joint-partnership: Maynard-Smith? Jackson? Some third party not currently involved directly with blood plasma production? Perhaps, since it was planning to enter the plasma fractionating business, the Red Cross would be interested in becoming a partner.

Another possibility was licensing. The major advantage if this approach was that YankeeTech could receive royalty payments for little additional investment. However, all royalty payments would cease in 11 n years, at which time YankeeTech might no longer be at the cutting edge of blood plasma separation technology. For these reasons, this option, though attractive from some angles, presented major problems:

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1) The most serious problem concerned the nature of the rights to be granted by YankeeTech to a licensee. In particular there was the question of a "field of use" limitation. While YankeeTech might be interested in making license agreements in the human blood plasma collection application, it might wish to exclude any licensee(s) in this application from the analytic, therapeutic or animal blood plasma collection applications. This might prove to be difficult in practice. For instance, if a hospital purchased a filtration device for blood plasma collection, there was nothing to stop it from using the device for analytic or therapeutic purposes where suitable. There was, however, a possibility that the separate filtration devices designed for different applications would be sufficiently unique so that product specifications could be written into a license agreement, thus, in effect, delineating fields of use.

2) If a competitor produced and sold devices that would infringe the YankeeTech patent and YankeeTech filed suit to stop such activity, the infringer would be certain to examine carefully any license agreement, hoping to find a possible antitrust violation or some indication of patent misuse which could prevent YankeeTech from enforcing the patent. Besides, litigation was very expensive.

Another problem with the licensing route was the question of what sort of license to grant:

Exclusive	Just one licensee would enjoy all the rights under the patent that currently accrued to YankeeTech.
Exclusive but for YankeeTech	The one licensee and YankeeTech would be the only companies to enjoy the patent rights.
Limited	YankeeTech would specify how many companies could enjoy the patent rights at the time the first company signed a license agreement, and could not subsequently exceed that number.
Nonexclusive	YankeeTech could offer licenses to whomever it chose, but the price and value of the agreement to the licensee would be lower.

Mr. Zamboni was not sure whether the protection of exclusivity was required to encourage a potentially strong licensee to make the investment necessary to commercialize the product. On the other hand, by granting more than on license, even at a somewhat lower royalty rate, YankeeTech might encourage competition, thus hasten market development, and generate higher total royalties.

If a license or licenses were granted, Mr. Zamboni had to decide how much money to charge for it, and in what way that money would be charged. As a rule of thumb, he
believed that the licensor typically received between 10% and 35% of the profits that the licensee made during the life of the license. If Maynard-Smith were a licensee, the problem would be doubly complicated since the price at which the filtration units were sold would be an administered transfer price from one division to another, and not a market-determined price. Finally, to the extent that any licensee sold the filtration unit as one part of a blood plasma collection kit, there could be a problem in determining the value of the kit.

How high should the fee be set? A high fee might bring in a good return of royalties to YankeeTech, but too high a fee might discourage companies from taking licenses, and/or lead to their developing alternative filtration devices outside the patent. Further, Mr. Zamboni wanted any licensee to commit sufficient resources to bring products to market under the terms of the license. Therefore, he would have to find a way of ensuring that any licensee would move quickly to gain FDA approval and place products on the market, so that YankeeTech could begin to receive earned royalty payments. He thought that minimum royalty payment might solve this problem. If he did institute minimum royalty payments, he would have to decide how much they should be, and whether they should be constant or based on an ascending or descending scale. Other approaches to motivate potential licensees while protecting the interests of YankeeTech should also be considered.

The major choices of possible licensees included Maynard-Smith, Jackson and Behrstein, a Germany company. While Mr. Zamboni believed that an exclusive license, which provided a monopoly for the licensee, would be attractive to all, neither Maynard-Smith nor Behrstein had expressed strong interest; however, Jackson indicated some interest in such an exclusive arrangement.

The major advantage of Jackson as the exclusive licensee would be its dominance in the U.S. market, being closely tied to the independent commercial blood collections centers, and the Red Cross. If Jackson decided to push the YankeeTech filtration process, (and influencing this motivation was a challenge that Mr. Zamboni recognized as being a challenge), Mr. Zamboni believed that impressive sales would result, although Jackson would have to provide significant sales force and service efforts to persuade the independent centers to adopt the invention. If Maynard-Smith took up the license, the adoption of the invention might be faster, since Maynard-Smith owned its own blood centers; however, it accounted for only 20% of the blood plasma collected directly on an individual basis from paid donors. On the other hand, for years Maynard-Smith had tried with little success to lessen Jackson's hold on the independent centers, and the new filtration process might finally accomplish this goal.

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Behrstein was a major company in the supply of blood collection kits to blood plasma collection centers in Germany. A license to the YankeeTech patent could be a way of gaining a foothold into the blood plasma business in the United States as well. However, Mr. Zamboni considered it unlikely that Behrstein would achieve significant North American penetration in the next few years, even if it had exclusive rights under the YankeeTech patent. Its strength in Germany, however, raised the question whether Mr. Zamboni should put territorial restrictions on licenses. He knew that, although Jackson and Maynard-Smith were active into the blood plasma business abroad, other locally based companies might be significantly stronger. He guessed that the potential for YankeeTech's process in blood plasma collection overseas might be considerable. The Japan market, in particular, deserved careful attention, but would probably require the active participation of a Japanese company.

Human Blood Plasma Analysis and Therapy

Human Blood Plasma Analysis could require the development or acquisition of large volume blood plasma, analysis facilities. It might therefore, be better to license this application to analytical laboratory companies or even to certain large hospitals. Choice of a strategy thus required careful thought.

Commercial development of the blood plasma therapy market was some years away, but Mr. Zamboni wanted to retain the rights in this field for YankeeTech, if possible. He saw a good fit between this application and the blood filtration application for artificial kidneys which the company was developing, and he anticipated that NIH would be willing to fund research and clinical testing in conjunction with outside medical researchers, as it had done in the kidney field, especially as regards the potential AIDS benefit.

Mr. Zamboni realized that he and his team were going to have to decide now how to approach this market if technical development efforts proved successful; YankeeTech might enter the market directly; a joint venture might also be a possibility. Finally, there was the possibility of licensing, and once again the question of whom to license.

Animal Blood Plasma Collection

The identification of the animal application was so recent that YankeeTech executives had given little thought on how to proceed. YankeeTech's executives were fairly confident, however, that they could successfully insulate this application from the other applications, and that providing for field-of-use restrictions would not be difficult, whichever commercializations route was chosen. This application could also be used, however, to enlarge the scope of a transaction directed to blood plasma therapy.

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Additional Relevant Facts

1. YankeeTech prepared an attractive licensing Memorandum which highlighted the features of this technology, including envisaged applications and the scope of existing patent protection. This material was sent to the Chief Executive Officers of Jackson, Maynard Smith and Behrstein.

2. A few days later there was an announcement in the press that Behrstein and Maynard Smith had merged. The new entity, to be named "Hemoglobal," had worldwide annual sales of $6.8 billion. Just prior to the merger, Behrstein had acquired a 49% interest in Watanabe, Ltd., a major Japanese hospital supply company.

3. Mr. Zamboni received a faxed letter from the Vice President for Corporate Development of Jackson Industries to the effect that their company was interested to meet promptly with YankeeTech to explore all possible applications of the new technology. He suspected that this initiative had been inspired by the "Hemoglobal" merger.

4. The next day, a fax was received by Mr. Zamboni from the Chairman of Hemoglobal in Germany expressing worldwide interest and suggesting an early conference.

5. Mr. Zamboni received approval from his Board to invite delegations from both companies, and was instructed to prepare negotiating strategies.

AS THE CURTAIN RISES . . .