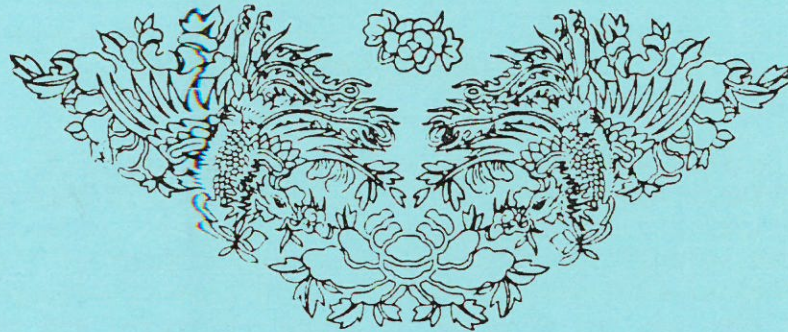


The Association of Chinese Food Scientists & Technologists in America

旅美中國食品科技學會

會誌



NEWSLETTER

Statement of Position and Editorial Note . . . . .	i
Introduction of CAFS - Editors . . . . .	1
A Letter from the President - Anthony H. Chen. . . . .	2
A Letter from the Membership Committee - George Chu. . . . .	4
Report from Employment Committee - Chifa Lin . . . . .	5
Announcement from Award Committee - Daniel Fung. . . . .	5
Report from Publication Committee - Peter Wan. . . . .	6
Results of Ballot - Editors . . . . .	6
Activity of Our Members - Editors. . . . .	7
Introduction of Company - Land O Lakes - 黄安一 . . . . .	8
遺傳工程與生物科技 - 張天鴻 . . . . .	11
Radiation Preservation of Foods - Shan-Shan Sheu . . . . .	13
How to Make a Speech - George Plimpton . . . . .	15
Performance is the Key of Career Success - A. J. Schick. . . . .	17
Survey for 1984 Forum. . . . .	19
Membership Dues Form and Financial Report. . . . .	20
Treasurer's Report - J. C. Jao . . . . .	21

VOLUME 6  
NUMBER 2



DECEMBER  
1983

# 旅美中國食品科技學會

The Association of Chinese Food Scientists & Technologists In America

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## STATEMENT OF POSITION

### 陳慶筠

Consulting & Workshop  
Anthony H. Chen

The Chinese American Food Society (CAFS), formerly the Association of Chinese Food Scientists & Technologists in America, is a non-political and non-profitable ethnic Chinese organization dedicated to the scientific and professional betterment of its members. The members of CAFS wish to interact with all Chinese scientists wherever they may reside based on common cultural and scientific interests.

### 朱正中

Membership  
George C. Chu

### 馮貽澤

Award  
Daniel Y. C. Fung

CAFS takes no political stand or preference. Selection of material for all CAFS publications is based on the scientific content and general interest. Any inadvertent political connotation should not be deemed as the official position of CAFS.

### 林啟發

Employment  
Chifa F. Lin

## EDITORIAL NOTE:

### 林輝正

Annual Meeting  
Santa H. C. Lin

- The name of this organization has been formally approved by our members to change from the Association of Chinese Food Scientists & Technologists in America (ACFSTA) 旅美中國食品科技學會 to Chinese American Food Society (CAFS) 華美食品學會.

### 林信南

Advisor  
Sherman S. Lin

- The purpose of the Newsletter is to brief you on major events that happened in the past and those that are planned for the future. All the officers and various committees need your feedback and input.

### 呂秋娟

Student Affair  
Sheree C. C. Lin

- To better serve all the members, the Publication Committee needs your comments about the types of articles that should be included and your generous help in providing articles or valuable information. Therefore, please respond to the surveys each time we send them to you. In this Newsletter, we again ask your opinion on several issues; please send it at your earliest convenience.

### 萬建心

Publication  
Peter J. Wan

- If you would like to participate in any activities of the CAFS, please DO NOT HESITATE to inform Tony Chen or the specific committee chairperson.

### 薛維誠

Legal Counselor  
Robert Hsueh

# 華美食品學會簡介 編輯組

CHINESE AMERICAN FOOD SOCIETY

(Formerly: The Association of Chinese Food Scientists & Technologists in America)

一九七五年美國食品科技學會 (INSTITUTE OF FOOD TECHNOLOGISTS 簡稱 IFT) 在芝加哥舉行年會，由會的中國會員藉機在中國城的餐館歡聚，當時一致決定成立旅美華人食品學者聯誼會。此後會員人數逐年增加。如今已成為一個擁有一百廿餘人的學術性組織。會員遍佈各大食品公司、大學及政府研究機構。其中具有博士學位者高達115人。獲有碩士學位者有59位。在學府任教者22人。具有經理以上職位者有38位。

在歷屆會長幹事們辛勤的耕耘下，這個團體急速地成長茁壯。對會員服務的項目逐年加新。一九八二年度更是一個具有突破性的年頭。先是經過會員投票通過兩項重要的會章修正案。一是會長任期由一年延長為二年。二是會員年費之調整。一年四期的會誌作了切合需求的革新。內容包括：公司學府推介、專長科技、自我進修的文字及求才謀職的消息。一九八二年 IFT 年會時，首次為會員們舉辦了就業準備及事業發展座談會。效果良好。今年 (1983) IFT 年會中，曾以如何在美國公司升遷及如何成功地交換思想及意見為題作深入之討論。同時首次頒贈“學術成就獎”及“優秀學生獎”。

基於這個組織成員的素質，極具為國人提供科技援助之潛力。因而除了努力互相砥礪學習之外，會內設有顧問及就業輔導委員會。並加強和國內外的學術團體交換心得意見。曾有兩位會員抽空為台灣舉行的水產加工講習會擔任講員。今夏 (1983) 又有五位會員返台參加國建會。今年十月份將有六位會員在聯合國的資助之下為北京及四川舉辦兩個講習會。今後本會仍將本屆已立之人，已達達人的精神為會友對同胞提供力所能及的服務工作。您或是您的朋友若對本會有興趣，請與會長陳慶鈞博士連絡：Dr. Anthony H. Chen, 3333 N. Central Expressway, Richardson, Texas 75080 USA.

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## A LETTER FROM THE PRESIDENT

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### 薛維誠

Legal Counselor  
Robert Hsueh

Dear Member:

Greetings. As the end of 1983 comes closer and closer, perhaps it is appropriate to reminisce on the activities occurring in the past few months.

Dr. Bill Chang has resigned from Corning Glass Works and relocated back to Taiwan to further his career. Bill is not only a dear friend of many of us, but is also one of the main driving forces for our organization. I would like to thank Bill for his contribution to our organization and wish him well in his career.

The issue of changing the name of our organization has been resolved. The majority of the votes are in favor of using our name as: Chinese American Food Society (CAFS) and 華美食品學會.

Last October, I led a delegation of six to mainland China. This project was sponsored by the United Nations Development Program. Six

four-day workshops on various topics were conducted in Chongqing. We also gave lectures and consultations in Beijing and Guangzhou. All the activities were well received and appreciated. Tentatively, we are scheduled to send two consulting teams to mainland China next year. These teams will address the issues of "Soybean Protein Utilization" and "Corn Overall Utilization." Anyone who is interested in participating in these projects, please contact me.

Last October, our President Elect, George Chu, visited Mr. K. T. Lee (李國鼎) and Mr. S. Lee (李肅) while he was staying in Taiwan. George discussed the possibility of setting up some projects with them. I also wrote a letter to Mr. K. T. Lee last month, encouraging him to take advantage of the expertise of CAFS.

In the past year and a half, our organization has progressed a great deal. However, we need to further expand and develop so that we can remain one of the major forces among the Chinese professional societies. To accomplish this goal, we need capable and dedicated officers. For those who have a desire to serve for the next two years, please contact me or George Chu.

May you and your family have a Merry Christmas and a Happy New Year.

Yours truly,



Anthony H. Chen  
President

AHC/sw

ANNOUNCEMENT OF MEMBERSHIP COMMITTEE

George C. Chu

諸位 ACSFTA 會員:

自今年的 IFT 年會以來, 其中一項重要的目標是如何增加我們學會會員的人數, 就如在上期的會刊裏我給諸位之信中所提, 我們想要增加中國人在美國食品工業界學術界的影响力及重要性, 唯一的途徑是我們聯絡起來, 透過這個組織來改變, 提高我們中國在美食的方面地位。而會員的增加, 學會的擴充, 再加上許多不同的活動, 是付迫不及待的事。

為了達到這個目標, 我們數位幹事, 按着 AACCC, SSOT, A 及 IFT 的通訊錄, 祇要看到類似中國人的姓名, 一一打電話邀請他們參加我們的學會。同時間, 我們更需要諸位的支持及參與, 在你的同事或朋友, 學生當中有從事食品方面之人, 請你花些時間邀請他們來參加我們的學會。

謝以你們在這方面的努力支持。

若是有任何地方需要幫助。

請電 214 - 231 - 6121 Peter Wan  
205 - 355 - 8815 George Chu

敬祝  
祺安

朱己中 敬上

## REPORT FROM EMPLOYMENT COMMITTEE

Chifa F. Lin

- It is about time for the new graduate to prepare his or her resume. If you would like to have some experienced professional to help you in preparing it, please send a copy of your resume to Chifa Lin, Food Ingredient Section, Stauffer Chemical Co., Dobbs Ferry, NY 10522.
- You can also file a resume with me. When a job lead becomes available, we will inform you as soon as possible.
- A telephone interview is frequently used by potential employers and head hunters. If you need some help in this area, please also let me know.
- A few job leads:
  - Dr. Iris Lee at Anheuser-Busch, Inc., 1101 Wyoming, St. Louis, MO 63118, is still searching for a few food scientists and technologists with a strong baking background.
  - Quaker Oats needs a chemical or food engineer with seven or more years experience. He or she will work with food scientists, and should have knowledge and experience in evaporation, spray drying, extrusion, thermal processes, etc.Contact: Mr. Lowell Foster, (213) 487-1422. Mr. Foster is a head hunter.

## ANNOUNCEMENT OF THE AWARDS COMMITTEE

Daniel Y. C. Fung, Chairman

We are indeed proud of the winner of the first Achievement Award for Outstanding Chinese Food Scientist in America--Dr. Stephen S. Chang. It is time for us to start the process of evaluating the second winner. Please nominate an outstanding Chinese Food Scientist by presenting a letter of nomination, 2 additional members' endorsements, and a complete vita of the candidate and send the entire assemblage to Daniel Y. C. Fung (Call Hall, Kansas State University, Manhattan, Kansas 66506) as soon as possible so that the committee members (Dr. Tung-Shan Chen, Dr. Tung Ching Lee, Dr. Y. Hang and Dr. Levi Chang-Ganf Ying) can evaluate the materials and come to a decision in April, 1984. Deadline for nominations is April 10, 1984.

## REPORT OF THE PUBLICATION COMMITTEE

Peter Wan

- Newsletter needs your input; if you would like a certain type of information printed, if you have some ideas or new findings in food related areas to share with the members, or any other comments or suggestions, please let us know. We will do our best to fulfill your needs.
- The response to writing articles for the Chinese Daily News (世界日報) was good. If you would like to participate, please notify Peter Wan at 3333 N. Central Expressway, Richardson, TX 75080. So far, I have received two articles:
  - All members who committed to write articles, please inform me of the titles and the dates you are going to send them in.
  - Names for this section in the Chinese Daily News (世界日報) were suggested by many members and they are listed in the following. If you have any other suggestions, please write to me. Thanks for your support.

## RESULT OF BALLOT

### THE ISSUE:

To change the name of our organization from The Association of Chinese Food Scientists and Technologists in America (ACFSTA), to Chinese American Food Society (CAFS), and from a very transient Chinese name "旅美中國食品科技學會", to "華美食品學會".

### THE RESULT:

Among the returned fourteen ballots, twelve approved the issue and two opposed it. Therefore, the name of our organization has been formally approved by our members to be changed to Chinese American Food Society and 華美食品學會.

### COMMENTS:

Early this year, a similar ballot was sent out to our members; 21 members approved the change and 15 opposed it. Even though the issue was approved, it was considered invalid due to the improper procedure. According to our by-laws, before any major issue can be put to a ballot, it has to be discussed, debated, and submitted to all the members of the organization by our executive committee. This was done, and approved by the executive committee during the 1983 IFT meeting. Consequently, the second ballot was sent to the members along with the Vol. 6, No. 1 issue of Newsletter. All the stationery and newsletters will use the newly approved name at the beginning of the coming fiscal year (6/1/84).



## ACTIVITIES OF OUR MEMBERS

Editors

- George Chu visited Taiwan - While George Chu was in Taiwan in September, a meeting was held among Messrs K. T. Lee (李國鼎), Shiu Lee (李秀) and George Chu to discuss the continuation of involvement of our members with the Council for Agricultural Planning and Development, as well as possible joint projects between Taiwan's Food Industries and members of ACFSTA. Due to their open-mindedness and cordial attitudes, the results of the meeting were very positive. Mr. Chu reported there is a good sign that our members will have more opportunities to serve our Mother Country.
- Professor Daniel Y. C. Fung was given the 1983 Faculty Service Award by the National University Continuing Education Association, due to the success of a microbiology workshop he organized. This workshop is designed for microbiologists, food scientists, medical technologists, quality assurance and control managers, consultants, laboratory directors and researchers. If you want to know more about it, please call Dr. Fung at (913) 532-5654.
- Daniel Y.C. Fung toured Europe in the summer of 1983. He reports:

Far away from my daily routines I spent a lovely tour of Europe this summer. It was a combination of work and pleasure. In 6 weeks I gave 15 lectures in Finland, France and Germany and then visited Italy and Greece. The tour included presentations of research papers in the Quality of Poultry Meat Symposium and the International Symposium in Bacteriology, both in France. In Finland, I was the University Scholar at the University of Helsinki and gave several lectures at the Meat Research Institute. In Germany, I visited the Milk Research Institute and discussed research work with scientists there. I was well received everywhere I went. It was indeed a humbling experience to be treated so well!!

The visit to Italy and Greece was fantastic. Seeing all those ancient ruins, great works of art and beautiful scenery really up-lifted my spirit. My family had a wonderful time too during the whole tour.

I encourage all of you scientists, especially the younger ones, to be super active in your field so that you can develop or invent something unique in Food Science to talk about in your area of specialization. Never be satisfied with mediocrity. Life is too short for that. Shoot for the stars.

The old Chinese saying "In books thou shall find houses of gold,

In books thou shall find beauties truly great"

I found that this IS TRUE.

書中自有黃金屋  
書中自有顏如玉

Daniel Y.C. Fung is the Chairman of Food Science Graduate Program at the Kansas State University.

## 公司介紹

Land O' Lakes, Inc.

Land O' Lakes, Inc. (簡稱 LOL). 總公司設於中北部的  
明州. 由於明州多湖加上農民有地, 而公司本身性質仍是  
Cooperative. 所以將地兩湖合併起來即稱之為  
Land O' Lakes.

在美國除了 FarmLand 以外 LOL 可說是第二大的 CO-OP.  
LOL 是不對非引股學的公司. 完全屬於農人的. 因此  
LOL 的宗旨是將農民生產的原料加工後直接銷售到  
市場上. 由於不經過中間商. 所以是完全替農民賺錢.  
另一方面. 則是完全替農民服務的機構. 公司設有  
"Answer Farm". 只有農民遇到任何艱難則公司會之  
刻派出技術團替他們解決問題. 由於是服務的  
性質所以是不收取任何費用的。

在整個組行方面 LOL 分為下列數部門。

### LOL. Food Group.

這是 LOL 最大的一部門 它的產品幾乎全是乳酪品。  
產品中分為二種. 一為 consumer products 另一為  
Industrial products. 換言之即 LOL 生產加工原料及  
食用成品。在 consumer products 方面有名的  
產品有 Butter, Margarine, Blend products, natural  
cheeses. (cheddar, Colby, Swiss, Bleu, etc).  
process cheese, cheese spread, milk,  
ice cream, cheese sauces, 等等產品。

在 Industrial product 方面則有 milk powder,  
non-fat dry milk powder, cheese powder,  
whey, Soybean, Soybean oil, special

blends 用於 Bakery, pudding mix 等等許多產品。

Felco:

此部門仍是專替農民服務的。它本身有研究中心。其主要的服務包括：種子，牧草，飼料，動物品種，肥料，獸醫，病蟲害防治，牧場的設計與建設，等等。總之是以針對牧農或農人各項而分別設有專門部門。

Midland.

此部門是於三年前加入 LOL。其主要的任務是供應華人生產方面的器具，油料以及農民家庭所需的各種一切東西。從廚房的刀叉到臥房的傢俱。無所不有。

Albert Leo

這是目前唯一剩下的 Meat processing plant。主要產品是 Turkey product。外是整隻到所有的 Turkey products。例如，Turkey Rolls, Turkey patties, Turkey stick, Turkey Hot Dog, etc.)。由於不太賺錢大有被宰的可怕。

Spencer Beef:

二年前加入 LOL。於今年已轉讓給 Cargo。原因何在，用不着解釋了。

Dawson Soy:

四年前加入 LOL。一直虧本。除 oil division 仍存在以及其他的各部門全都打洋也。

Research & Development:

一共只有 35 个人. 每年都有五、六十个 projects 但 R&D 的 Budget 可不值一提. 因为文方的可十倍。

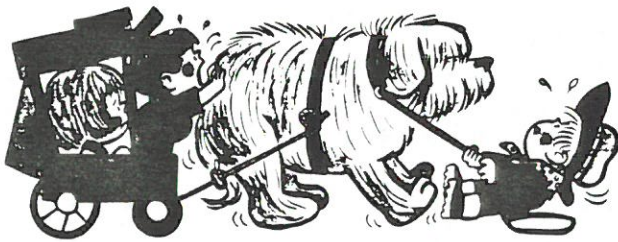
R&D 只要分为下列各部的

Exploratory, New products, cheese Research.

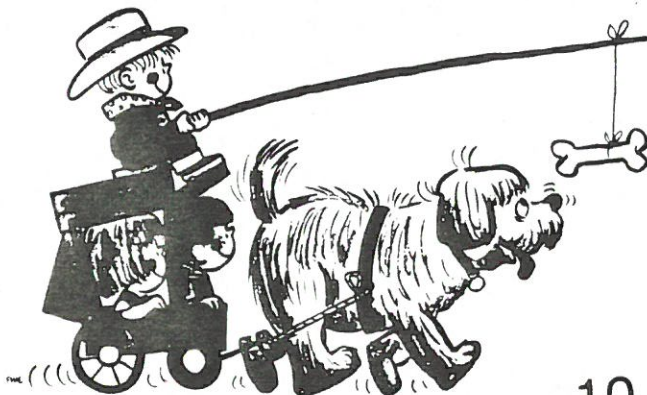
Dairy products (除 cheese 外), 及 Engineer.

另有一个相当大的 pilot plant. 该厂还满齐全的. 凡是 Dairy 方面该厂的机器, 大概无都可找得到的.

总之, LOL 是农人所拥有的公司. 也是美国政府的鼓励成立的. 因此它不向外国发行股票. 此种 coop 同国内的合作社又不相同. 将来国内对 coop 有兴趣时大可藉镜于 LOL 的组织及建造方式替中国的农民服务。



Let's concentrate on solving problems not fighting them!



願各位會友  
有  
個  
更  
成  
功  
的  
一  
年

# 遺傳工程與生物科技

張天鴻



本報  
專欄

## 一、引言

最近歐美各先進國家，對生物科技之研究，風起雲湧，全力以赴。這是近十年來最熱門的題目之一。其主要原因是由於在七八〇年代初期，幾項實驗有突破式的發現，大家不約而同地發現，原來屬於較基礎性質的科技研究，居然可以很快地跳入工業化生產的應用研究，進而迅速開發產品，造福民生。這種由基礎研究跳入商品生產的發展速度前所未有。而商品生產時遇到的困難，又往往必須依賴更進一步的基礎科學研究解決，不像其他各行科學，理論基礎之研究和應用實際的困難解決往往相隔甚遠。是故生物科技從事之人，多必須有「科學整合」的廣泛知識，方可勝任。

生物科技之進展為何會如此之快？最主要的原因是幾項技術不約而同地到了「水到渠成」的成熟階段，不但能夠揭開生命奧秘，還可以大幅降低生產生物化學產品的成本。此種「成本降低」的概念，由於兩位先驅企業家能把握時機大力推廣，吸引金融界投資大眾的注意，和其他科學界的興趣，加速「科學整合」的衝量速度。所以能在短短十年中成長到數十億美元的工業，而且才不過是開端而已。

本文之目的，想把生物科技中「降低成本」最有潛力的一項技術，也就是「遺傳工程」，作大概介紹。主要着重在如何利用遺傳工程生產新產品賺取利潤，它與生物科技其他各環節的關係，以及長程發展可能達到的目標。

## 二、生物科技的定義

依照美國麻省理工學院教授Dr. Charles Cooney之說法，生物科技是結合生物化學、微生物學，以及化工操作之科技，藉以改變自然環境，生產有用商品的技術。這項定義之重點在於強調生物科技的技術注重生產的實用技術，雖然在實驗室中分子生物研究工作或十分精細，但是莫不有「立即可用」的目標。職是之故，使用遺傳工程，也是為了達到「立即可用」目的之研究手段。另外還有細胞融合、組織培養、固定酵素(或作「固定生化酶」)包含固定細胞反應器以及固定酵素反應器(一種)，等等，再加上帶帶相關的產品回收技術，例如各種色析儀(Chromatography)濃度反應器、電析分離器(Electrophoresis)，自數公升之操作量增額到數萬公升，其中可能發生的化學、

## 三、遺傳工程在生物科技的功用和地位

(一)降低成本：在目前階段，吾人所知最為明顯可行，使用遺傳工程可以獲致立竿見影功效者，首推降低生產成本。如上所述，生物科技之生產工作，多利用微生物或組織細胞為基本操作單位。是則各基本單位之生產效率和整個生產的成本有密切關係。如某酵母菌原先生產維生素B<sub>12</sub>，每細胞在自然環境中只會製出足供自用的份量(假設約1mg)，就不再做。其控制之方法，是根據先天遺傳基因中「遺傳的信號」經過相當複雜的生化系統反應後完成控制。今使用遺傳工程技術，可以在這聯串反應過程中加以干擾。其中之一法，可增加維生素乙合成酵素之倍數，(假設反饋抑制feedback inhibition，前

物理現象以及實際工程技術問題，在目前化工課本中都找不到解答，甚至連理論基礎都還在起步階段，所以，上述麻省理工學院教授之定義，只是非常粗放地劃了一個輪廓。多半時候若有人問一名目前從事類似工作的人員「何謂生物科技？」他大概可以告訴你什麼不能算是生物科技，而不能圓滿答覆所有應該包含在「生物科技」一詞中的項目。

身生產Precursor production，以及其他他種輔助Coenzyme之供應均不成問題(使其每細胞中原先只有一個分子的酵素，增加到四、五十個分子)。再大量供應維生素乙之前身(Precursor)，使這些多出來的合成酵素可以有武之地，迅速地將各前身改造為維生素乙。因而每細胞單位產量可增加到50mg，成本降低之效益，自不待言。此例只是數十種可採行戰略之一。而且許多條件與假設都必須符合。若以目前所知各種戰略所有的增倍生產潛能綜合起來，加以樂觀的估計，則單位產量每公升(5)公克升到10公克，亦即增加生產效率十個到百個倍，並非不可能之事。自然，這種情況有許多限制，後文將略述目前可達到的實際境界。

## 四、遺傳工程在企業上的應用及其限制因素

上述各種遺傳工程的功效，理論上是可以應用在任何有生命的細胞裏。可是實際由於細胞的生理構造千變萬化，生化反應也各有不同。吾人瞭解而可運用的部份仍太少，不能拿起任何題目就做。如果要將包含遺傳工程在內的生物科技題目當做圖利的企業，投資的風險仍然相當大。所以目前美國各大生物科技公司的研究專案遴選過程中，大多需考慮下述幾項限制條件：

(一)工作對象之蛋白質越簡單越好：目前來講，蛋白質之氨基酸單元不超過一八〇個(換句話說，蛋白質分子量在8,000左右)，較有把握。再大一些，就會碰到分子扭曲不整，或基因不穩定的種種困難。最近所知已可以遺傳工程大量生產的最大蛋白質，是凝乳酵素(Calf rennin)。其分子量約30,000，含三百餘氨基酸。必須將一千餘相關的核酸基因訊碼(Codon)分成三組分別操作，最後才聯在一起裝在一個相當大的遊離子(Plasmid)中，設法保持其穩定狀態嫁接到大型桿菌或稻草桿菌中，進行發酵生產。全部的研究發展過程中許多大大小小的困難都是

前所未見的。以 $10^6$ 的分子量而言，在已有資料的兩千多種酵素中實不寡大。因此更大的分子例如有五十萬分子量者，目前尚無可能控制自如。

(二)對工作對象之基因來源細胞，最好對它的生化系統已有相當充分的資料。換句話說，自一些無名花木虫魚鳥獸，至今尚未充分瞭解的生命系統中提煉基因，要比較困難。如果是重新組合釀酒酵母和烘焙酵母中的某些基因，則其成功率要大得多。

(三)工作專案之目標，最好是基因的直接產品，也就是蛋白質本身。如果是間接產品，要用三個酵素順序作用才能生產的代謝物，則困難較大。兩三個酵素尚植物或菌類等，則困難較大。兩三個酵素尚可。超過四個酵素則目前尚無法估計成功率。

(四)目標產品最好是細胞外分泌物。如此在重組基因增加產量後，回收以及純化之手續較為簡單。此點尤其在生產藥物時特別重要。產品不能自動分泌到細胞體外時，必須經過打碎，分離細胞中其他雜質，過濾、淨化等手續，成本將比自動分泌者高出三十%以上。自動分泌還有一個好處，就是在連續自動化生產工程設計時，可有較高效率，因為一般細胞本身不能積聚太多目標產品於體內。任何時候，任何產品在細胞體內占乾重量的百分之十以上，就會中毒死，有些產品甚至更低。今如產品可自動排出體外，則細胞之單位產量可大為增加。更進一步可設計固定細胞反應器，自一端送入原料，經固定住的細胞吸入體內轉化成產品後分泌出來，由另一端

源源不絕地收穫，比起現有分批或發酵，效率應可大幅增加，這種技術目前是在各方研究的熱門題目，但不在本文討論範圍之內，在此不贅。

(五)安全問題：基因之重組研究，由於牽涉到生命最基礎的化學單元，自不應大意從事，目前根據美國衛生署的規定，與工業生產有關的限制項目大約如次：病原微生物之遺傳工程研究，每次實驗操作不可超過十公升容量，而且實驗室之密封，消毒，通風設備均有極嚴格的規格，以確定實驗室中之變種不會意外流入外界，造成疫病。基因移入的寄主，只限於非病原性的三種微生物，可以用來作超過十公升的發酵液。

此三種為大腸桿菌、稻草桿菌、以及酵母菌，這是因為吾人目前對上述三種以外的微生物遺傳系統瞭解太少，不能隨意基因移入後可能發生的突變，以及萬一逸入自然界後對生態環境的影響，如要操作數萬公升之容量，不宜冒險。另外，工作人員的健康檢查，經常性的品管，以及酒精廢水廢氣之處理，都有特殊講究的規定，這些安全限制，世界各國均以美國標準為首是瞻。只是在細節執行時視各國實際國情繁簡不同而已，由於這方面的投資要求特殊企業投資時不動產成本及相關之動率成本也較高，遂成為工作專案一大考慮。

最後，當然也是最重要的一點，就是一賠本生意沒人做。目標產品之單價，產量市場需求，銷售網之建立，營利報酬率大小，起始之投入資金老本，要多久才收得回來，是否可以用一塊來分擔風險等等，都是一般企業需要知道的資料。唯因遺傳工程和生物科技從無以往經驗可資借鏡，每日所做的估計都可能因次日在研究技術上的突破而必須重新修正。是故，在做投資可行性之檢討時，務求適當，最好找高價值的目標產品(例如每公克十美元以上者)。這類產品，多半也必然不需要大堆生產設備，只是需要較精密的儀器以求產品品質。再者，產品上市後銷售的預測，必須包括主管政府機關審核待時的考慮。比如說，腦下垂體之遺傳工程生產，假設需五年可成，其審核時限起碼要再加三年，因為臨床實驗非同小可。如不需臨床實驗之產品，例如直接生產高碳脂肪酸之酵素用於塑膠工業中，其審核時間可望於一年半之內完畢。綜言之，類似的許多項細項目，有的是技術性質，有些非技術性質，都必須有專人經常將各主管單位密切聯絡在一起，隨時檢討，以確保研究發展的方向朝最適方向前進。絕不可能一次就訂出五年計畫，然後一成不變地照頭猛衝。

### 五、長程發展的展望與結論

遺傳工程在一九七八年因為基能(Genentech Inc)公司股票上市，在華爾街股票市場中一日上漲五十餘元，獲資金近兩億美元，而釀成全世界注目的技術。連帶地，生物科技也行情大漲。一連有三年之久，大小公司崛起不下兩百家。可是經過經濟不景氣的考驗，以及一些經營不善倒閉的例子，現在多數人已可較為理智地估計此類科技對人類社會的長短期影響，以及站在營利企業立場應如何正確地處理這方面的投資。筆者認為有一種預測方法較為簡單特介紹如下圖：

產品單價(美元/公克)  
10000 1000 100 10 1 0.1  
出世時間(年)  
1982 1984 1988 1994 2002 2010

此圖顯示如專以遺傳工程技術，生產各種不同價值的產品，其可能到達商品經濟可行階段所需之發展時間。主要預測之依據是產品價值高者，所受到的研究努力也更多，如將以往抗生菌生產時研究發展之軌跡加以一些修改，將累積的研究投資濃縮在遺傳工程發展的歷史上，其進步的速度應可依上圖進行，但是，這不包括其他技術例如固定酵素反應器，所可能造成的影響。欲作任何實用的綜合預計，現在尚不可能，只能在想像中預測，類似的其他生物科技，如果能恰好互相配合，則上圖時間表或許可以縮短一半的時間。還必須配合世界石油化工的供應經濟情況，適合發展新的生化原料物質，方有希望適上圖發展的時間。

我國國力目前面臨昇級之轉捩點，在世界各國力爭上游的壓力下，不太可能任由民間自力與美國各大公司競爭。連日本、法國等已開發之國家，也必須由政府有關機關出面，協調公私研究單位，開列應發展的生物科技優先次序，然後分工合作齊頭並進。

我中華民國如何慎謀能斷，筆者認為應兼顧：①國家長期目標；②國際合作及競爭足以提高國家實力；③短期福利以向投資者及納稅大眾交代；以及④專門解決我國特有的工業問題，以求研究發展本身能早日自給自足，這幾項互相牽制的問題，宜於今年國建會中請各專家之力策思慮，獲致一些結論，則本文即已達成拋磚引玉之效。筆者不敏，願在此預祝成功！(本文作者為美國德州理工大學微生物博士，現任基能康公司事業發展部經理，出席今年國建會食品科技組)

## I AM ONE

*I am only one,  
But still I am one.  
I cannot do everything,  
But still I can do something;  
And because I cannot do everything  
I will not refuse to do the something that I can do.*

—EDWARD EVERETT HALE

## Radiation Preservation of Foods

Ionizing radiation was discovered just before the start of this century. Since the 1940s, beta-rays, X-rays and gamma rays have been of primary interest in food preservation. Their quanta contain enough energy to ionize molecules in their paths without appreciably raising their temperature, and can be applied in various ranges. At highest doses ( $10^4$ - $10^6$  Grays 1 Gray = 100 rads = 1 joule of energy absorbed per kg absorber) commercially sterile products are produced. At high doses ( $10^3$ - $10^5$  Grays), the microbial population is reduced which allows the extension of the product life. At lower doses ( $10^2$ - $10^3$  Grays), irradiation can be used for sprout inhibition and pest control. However, enzyme inactivation needs very high doses ( $10^4$ - $10^6$  Grays) which means that many foods such as meats need a pre-irradiation heat treatment to inactivate enzymes (1).

The use of irradiation conserves fossil fuels and has less of a destructive effect on nutrients than conventional heat treatment due to its uniform energy distribution and low operating temperature. It allows for sterilization of packages such as flexible pouches, cans, and even entire truck loads, thereby decreasing costs of storage and transportation. Also, it eliminates the need for many of the chemical food additives now in use.

Many irradiated foods were cleared for human consumption in different countries such as Canada, Japan, Thailand, South Africa, United Kingdom, the USSR and many other European countries. In the United States, however, this method is not as widely applied (2). Insect disinfestation for wheat and wheat flour and sprout inhibition for white potatoes were the two major uses. Other food items such as irradiated meats are being given to animals in feeding studies to evaluate the wholesomeness. In 1981, the FDA outlined actions which could lead to the approval of all foods treated at levels up to 1 KGy (kilogray) and suggested criteria for 1 to 10 KGy.

The decision for the acceptance of irradiated foods was based on animal feeding and chemical analysis of the products. However, animal feeding tests are time consuming and costly, and it is not practical to examine all food items at various irradiation parameters. Therefore, the "chemiclearance principle" was developed which says that if a regulation is passed on the chemical study of a food such as chicken, clearance will be given to all foods of similar composition. The study

of the effect of irradiation on the major food components was reviewed by Elias and Cohen (3). The radiolytic products showed the specific breakdown patterns of food components. Nutrient alteration depends on the radiolability and this destruction is in general milder than that of a thermal process for food. Some problems involved with irradiation, however, are the loss of highly radiosensitive vitamins such as Vit E and thiamin which could lead to a cumulative deficit in the diet if irradiated foods were to be consumed in quantity for a long period of time. Other foods do not lend themselves readily to irradiation treatment due to organoleptic problems giving rise to off flavors.

Production facilities are not yet very popular and irradiation is still considered to be a "new" technique, the economics of this method was reviewed by Deith (4) and based on the combined data from food irradiation research and nonfood application, the cost could be feasibly be as low as a small fraction of a cent per kilogram of food. The feasibility of this method was stated in 1980 by JECFI ( Joint FAO/ IAEA/WHO ) which concluded that irradiation of any food commodities up to an overall dose of 1 Mrad causes no toxicological hazard and therefore no toxicological testing should be necessary.

There is still much to study particularly on other irradiated food quality parameters such as color, odor, flavor and texture. Once food irradiation is established, it will be a new and improved application in the food industry,

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# How to make a speech

By George Plimpton



International Paper asked George Plimpton, who writes books about facing the sports pros (like "Paper Lion" and "Shadow Box"), and who's in demand to speak about it, to tell you how to face the fear of making a speech.

One of life's terrors for the uninitiated is to be asked to make a speech.

"Why me?" will probably be your first reaction. "I don't have anything to say." It should be reassuring (though it rarely is) that since you were asked, somebody must think you do. The fact is that each one of us has a store of material which should be of interest to others. There is no reason why it should not be adapted to a speech.

## Why know how to speak?

Scary as it is, it's important for anyone to be able to speak in front of others, whether twenty around a conference table or a hall filled with a thousand faces.

Being able to speak can mean better grades in any class. It can mean talking the town council out of increasing your property taxes. It can mean talking top management into buying your plan.

## How to pick a topic

You were probably asked to speak in the first place in the hope that you would be able to articulate a topic that you know something about. Still, it helps to find out about your audience first. Who are they? Why are they there? What are they

interested in? How much do they already know about your subject? One kind of talk would be appropriate for the Women's Club of Columbus, Ohio, and quite another for the guests at the Vince Lombardi dinner.

## How to plan what to say

Here is where you must do your homework.

The more you sweat in advance, the less you'll have to sweat once you appear on stage. Research your topic thoroughly. Check the library for facts, quotes, books and timely magazine and newspaper articles on your subject. Get in touch with experts. Write to them, make phone calls, get interviews to help round out your material.

In short, gather—and learn—far more than you'll ever use. You can't imagine how much confidence that knowledge will inspire.

Now start organizing and writing. Most authorities suggest that a good speech breaks down into three basic parts—an introduction, the body of the speech, and the summation.

**Introduction:** An audience makes up its mind very quickly. Once the mood of an audience is set, it is difficult to change it, which is why introductions are important. If the speech is to be lighthearted in tone, the speaker can start off by telling a good-natured story about the subject or himself.

But be careful of jokes, especially the shaggy-dog

*"What am I doing wrong? Taking refuge behind the lectern, looking scared to death, shuffling pages, and reading my speech. Relax. Come out in the open, gesture, talk to your audience!"*

variety. For some reason, the joke that convulses guests in a living room tends to suffer as it emerges through the amplifying system into a public gathering place.

**Main body:** There are four main intents in the body of the well-made speech. These are 1) to entertain, which is probably the hardest; 2) to instruct, which is the easiest if the speaker has done the research and knows the subject; 3) to persuade, which one does at a sales presentation, a political rally, or a town meeting; and finally, 4) to inspire, which is what the speaker emphasizes at a sales meeting, in a sermon, or at a pep rally. (Hurry-Up Yost, the onetime Michigan football coach, gave

such an inspiration-filled half-time talk that he got carried away and at the final exhortation led his team on the run through the wrong

locker-room door into the swimming pool.)

## Summation:

This is where you should "ask for the order." An ending should probably incorporate a sentence or two which sounds like an ending—a short summary of the main points of the speech, perhaps, or the repeat of a phrase that most embodies what the speaker has hoped to convey. It is valuable to think of the last sentence or two as something which might produce applause. Phrases which are perfectly appropriate to signal this are: "In closing..." or "I have one last thing to say..."

Once done—fully written, or the main



points set down on 3" x 5" index cards—the next problem is the actual presentation of the speech. Ideally, a speech should not be read. At least it should never appear or sound as if you are reading it. An audience is dismayed to see a speaker peering down at a thick sheaf of papers on the lectern, wetting his thumb to turn to the next page.

### How to sound spontaneous

The best speakers are those who make their words sound spontaneous even if memorized. I've found it's best to learn a speech point by point, not word for word. Careful preparation and a great deal of practicing are required to make it come together smoothly and easily. Mark Twain once said "It takes three weeks to prepare a good ad-lib speech."

Don't be fooled when you rehearse. It takes longer to deliver a speech than to read it. Most speakers peg along at about 100 words a minute.

### Brevity is an asset

A sensible plan, if you have been asked to speak to an exact limit, is to talk your speech into a mirror and stop at your allotted time; then cut the speech accordingly. The more familiar you become with your speech, the more confidently you can deliver it.

As anyone who listens to speeches knows, brevity is an asset. Twenty minutes are ideal. An hour is the limit an audience can listen comfortably.

In mentioning brevity, it is worth mentioning that the shortest inaugural address was George Washington's—just 135 words. The longest was William Henry Harrison's in 1841. He delivered a two-hour 9,000-word speech into the teeth of a freezing northeast wind. He came down with a cold the

following day, and a month later he died of pneumonia.

### Check your grammar

Consult a dictionary for proper meanings and pronunciations. Your audience won't know if you're a bad speller, but they will know if you use or pronounce a word improperly. In my first remarks on the dais, I used to thank people for their "fulsome introduction," until I discovered to my dismay that "fulsome" means *offensive* and *insincere*.



"Why should you make a speech? There are four big reasons (left to right): to inspire, to persuade, to entertain, to instruct. I'll tell you how to organize what you say."

### On the podium

It helps one's nerves to pick out three or four people in the audience—preferably in different sectors so that the speaker is apparently giving his attention to the entire room—on whom to focus. Pick out people who seem to be having a good time.

### How questions help

A question period at the end of a speech is a good notion. One would not ask questions following a tribute to the company treasurer on his re-

tirement, say, but a technical talk or an informative speech can be enlivened with a question period.

### The crowd

The larger the crowd, the easier it is to speak, because the response is multiplied and increased. Most people do not believe this. They peek out from behind the curtain and if the auditorium is filled to the rafters they begin to moan softly in the back of their throats.

### What about stage fright?

Very few speakers escape the so-called "butterflies." There does not seem to be any cure for them, except to realize that they are beneficial rather than harmful, and never fatal. The tension usually means that the speaker, being keyed up, will do a better job.

Edward R. Murrow called stage fright "the sweat of perfection." Mark Twain once comforted a frightened friend about to speak: "Just remember they don't expect much." My own feeling is that with thought, preparation and faith in your ideas, you can go out there and expect a pleasant surprise.

And what a sensation it is—to hear applause. Invariably after it dies away, the speaker searches out the program chairman—just to make it known that he's available for next month's meeting.

*Gene Shimpf*

## SIX IMPOSSIBLE THINGS

"There's no use trying," she [Alice] said: "one can't believe impossible things."

"I daresay you haven't had much practice," said the Queen. "When I was your age, I always did it for half-an-hour a day. Why, sometimes I've believed as many as six impossible things before breakfast."

—LEWIS CARROLL

# Performance Is the Key to Career Success

**Supervisors are interested in a quick solution to a problem, not that you handled it all by yourself, so don't be afraid to seek help from co-workers, in-house experts, and external consultants.**

A. J. Schick, Procter & Gamble Co., Cincinnati, Ohio 45241

Critical in starting and nurturing a progressive and successful career is job performance. It is the most important factor, even though your career can be affected by such factors as job choice, skill development and company visibility; these are interrelated with job performance.

Companies are *not* in business to sell a product or a service; companies are in business to make *money!* Companies hire bright and intelligent professionals like ourselves to help meet their profit objective. Thus, the most successful people in any company are those who the company thinks has contributed the most to helping the company meet its objective. The major way any company measures this contribution is through job performance, specifically the *quantity* and the *quality* of the work performed. Therefore, job performance is the most important factor in pursuing a progressive and successful career.

Early on in your career, you need to focus all your key activities on maximizing job performance. How do you do that? By choosing a job in which your skills and interests, and the skills needed for the job are most closely matched. The closer this match the higher the probability of maximizing job performance, which in turn yields the higher probability of being successful. To start this process, you need to thoroughly and truthfully evaluate your skills. This is a pretty tall task for most of us, because chances are we've never had to do it before; it's difficult to be unbiased.

The best way to start this evaluation is to look back at all your experiences in life. Look at your successes and your failures to gain insight on what you

do well and not so well. You should consider such factors as grades received in courses. What did you do best, in theoretical or practical courses? This could determine if a basic research or a manufacturing position would be best for you. If you were on the debating team, you probably have good oral communication skills. If you successfully headed the dance planning committee, you should possess good organizational skills. All of these can provide valuable insight into oneself.

## Five skill areas

Different jobs will require different blends of basic skills. There are five skill areas which are important: *problem solving, organizing and priority setting, use of resources, leadership, and communications.*

In a very generic sense, all professionals are hired to solve problems, whether it be how to optimize catalyst usage in a reactor, how to determine the optimum marketing strategy for a new product, or how to prevent a strike by your employees. The key is solving these problems quickly and yielding as optimal a solution as possible. Solutions to business problems yield good results for the company and recognition to the solvers.

In business we are always faced with more problems than we know what to do with at one time. This is why organizing and priority-setting skills are so important. Selecting the most important problems and organizing the optimum approaches to their solutions *effectively* will move the business forward the most.

Most supervisors are generally concerned with your approach to solving a problem and the speed in which it is solved, but not whether you solved it singlehandedly or not. For this reason, you should use all the resources available to you to solve the problem. This includes coworkers, in-house experts, and external consultants. Developing skill in using resources will not only enhance your job performance today, but it also allows you to gain knowledge from

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*The first article in this series, "Careers in Manufacturing and Marketing," appeared in April, pp. 23-27; and the second, "Getting Ahead: Ingredients for Career Advancement," was published in May, pp. 18-20.*

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the experts which you can use on future problems.

Leadership is the ability to assume the responsibility to solve your current problems. More importantly, you must be able to identify and propose new problems which need to be solved to move the business forward quicker and better.

Communicating effectively, what and why you did, and what and why you're going to do, gives the company a true insight of your skills and worth to the organization. Thus, communication (both written and oral) is often the key link between doing a good job and being recognized as doing a good job. Regretfully, few people realize early on how important it is to effectively communicate ideas and approaches in the business world.

By determining your blend of the above skills, you're on your way to finding a job within which you will have the greatest potential of doing well.

### Set your goal

You've done your homework, you're in the right job and performing; What can you do to build your credibility in the organization? Here again, job performance is your best asset. Through consistent, good job performance, you will gain the confidence and respect of your supervisor and immediate coworkers. Once your manager has confidence in your abilities, he will speak highly of you to his bosses and coworkers. You become known as a top performer and are given projects with more responsibility and visibility. As you can see, the whole process begins to snowball. Believe me, managers are always looking for bright individuals who have demonstrated their capabilities, for they get credit from their bosses for developing and promoting good people. Having your bosses do well through your good work is the first step in gaining a company sponsor.

There are other methods which can be used to gain visibility in a company. For example, you may participate in special committees at work which expose you to other management personnel outside your line or play on company athletic leagues. These are secondary ways to increase your visibility but are truly effective only if your basic job performance is good. If your job performance is poor, these methods only help managers associate a face with a poor performer, nothing more.

Throughout your career, job performance will continue to be important. Once you're off to a good start, an additional element becomes of growing importance in nurturing your career. This element is "being proactive." You must take an active role in your career. First, you need to determine what your personal success criteria are. Then, based upon them, you should establish goals for yourself, both short term and long term, and a basic time line for achieving these goals.

Most important in setting these goals are: 1) be realistic and 2) be under your own control. For example, for a graduate to set a goal of being director of research and development for a specific company in three years is not only unrealistic, but not under his control. That specific company might not be hiring new people over the next three years. A more appropriate goal would be to develop the skills necessary to

supervise a group in a research and development firm in three years. This goal is realistic from a timing standpoint; he also has some control over the goal through job performance and skill development.

By setting goals for yourself, you can focus more clearly on the skills you need to develop and demonstrate to achieve these goals. We all must remember that new skills will have to be developed or existing ones strengthened, in order to achieve future goals and advance in an organization.

Being "proactive" and making your management aware of your goals is the first step in achieving them. In this way, your management knows your ambitions and should be able to give you some general feedback around the potential of you attaining that goal. Also, through this type of discussion, your supervisor can point out specific skill areas which you need to work on to attain your goal, and can help you through training. Another way for you to determine what skills you need to move ahead is by examining the skills your boss and other successful people in the organization have mastered. With new skill development, your job performance and success will continue to be high.

**"Solutions to business problems yield good results for the company and recognition to the solver."**

### In summary

It is important to maximize job performance to be successful in your career. This is accomplished through evaluation of your skills prior to job selection. The better the match between your skills and those needed on the job, the better the chance for success.

Visibility in a company is important to getting ahead; good job performance is a sure way to receive visibility. Once you've established a good job performance base, you need to be "proactive" in your career. You must set realistic goals for yourself and be sure your company is aware of these goals. You will need to develop new skills and continue to demonstrate good job performance—good, basic hard work.

From: Chemical Engineering  
Progress 78(7), 1982

SURVEY FOR 1984 FORUM

We will have the 1984 Forum during the IFT annual meeting, which will be held at Anaheim, California in June. Please note your preferences for the Forum on the following:

FORMAT:

- Presentations or Seminars       Round Table Discussion

TOPICS:

- Technology exchange with Taiwan and mainland China
- Career development
- How to start your own business
- Other suggestions: \_\_\_\_\_
- 

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SURVEY FOR NEWSLETTER AND THE  
SPECIAL SECTION FOR THE CHINESE DAILY NEWS (世界日報)

I would like to see articles on these subjects:

- | Yes                      | No                       |   |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | Reports from officers.                    |
| <input type="checkbox"/> | <input type="checkbox"/> | Activities of members.                    |
| <input type="checkbox"/> | <input type="checkbox"/> | Introduction of companies and institutes. |
| <input type="checkbox"/> | <input type="checkbox"/> | Technical articles.                       |
| <input type="checkbox"/> | <input type="checkbox"/> | Career developments.                      |
| <input type="checkbox"/> |                          | Other suggestions: _____                  |
- 

- I would like to participate in writing Chinese articles for the Chinese Daily News (世界日報).

Signed: \_\_\_\_\_

Please send the survey form (along with your membership dues if you have not paid yet) to:

Dr. Y. C. Jao  
Miles Laboratories  
P. O. Box 932  
Elkhart, IN 46515

ACFSTA Financial Report  
by Y. C. Jao, November 7, 1983

I. Expense Budget

<u>Item</u>	<u>Description</u>	<u>Deposit/Credit</u>	<u>Payment/Debit</u>
1	From last financial report	1196.92	
2	Newsletter 6:1, printing and postage		321.00
3	Membership collected July 19, 1983 to Nov. 7, 1983	280.00	
4	Postage (P. Wan)		3.60
5	Miscellaneous income (P. Wan)	3.00	
6	Interest (Sept. 30)	11.39	
		1491.31	324.60
	Net	1166.71	

II. Award Budget

1	Fund raised	1040.28	
2	Presentation plaques		25.68 (\$12.84 x 2)
3	Interest (Sept. 30)	9.50	
		1049.78	25.68
	Net	1024.10	

Please return this portion with your remittance to: Dr. Y. C. Jao, P. O. Box 932, Miles Laboratories, Inc., Elkhart, IN 46515

1983-1984 ACFSTA MEMBERSHIP DUES FORM

(For 6/1/83 - 5/31/84)

<u>Membership Dues</u>	<u>Amount (\$)</u>
Student Member (\$5) . . . . .	_____
Professional Member (\$15) . . . . .	_____
Supporting Member (\$30 or above). . . . .	_____
Honorary Member (\$50 or above). . . . .	_____
Corporate Member (\$200 or above). . . . .	_____

NAME \_\_\_\_\_

## REPORT FROM THE TREASURER

Y. C. Jao

The current fiscal year (6/1/83-5/31/84) has already reached its halfway mark. Since the recent (1983) IFT annual meeting, I have received membership dues from 20 student members and 53 professional members. If you have not paid yet, please send your check to me at your earliest convenience. With your generous support, our financial status is reasonably healthy. Please see the attached balance sheet.

### MEMBERSHIP

The members who have paid their dues for the current fiscal year (6/1/83 - 5/31/84) are listed in the following. Should there be any error or questions, please inform me.

#### Supporting Members

Chu, George C.  
Kuo, Joseph D. C.  
Lee, Shu-Chi

Lin, Santa H. C.  
Ma, Robert T. I  
Tao, Michael C.

Yao, Ruy-Zi (Grace)  
Ying, Levi C. G.

#### Professional Members:

Ang, Catharina Y. W.  
Chan, James K. C.  
Chang, Kun-Yu  
Chang, Pei-Kung  
Chang, Stephen S.  
Chang, Tien Hung  
Chen, Anthony Hing  
Cheng, Hsiung  
Chia, Stanley S. S.  
Chou, David H. E.  
Chung, Ronald A.  
Hsu, Chwen Chwen  
Hsu, Kenneth H.  
Huang, Emil An-I  
Huang, I-Lo

Huang, Victor T.  
Huang, Yao-Wen  
Jao, Yun Chi  
Kao, Chuan  
Lee, Iris C.  
Lee, Siu-Leung  
Lee, Shyun S.  
Lee, Yanien  
Lee, Yuen San  
Lee, Yung Hsiung  
Liao, Fu Tarng  
Lin, Sherman S.  
Liu, S. S. (刘新生)  
Liu, Tien-Szu  
Luh, Bor S.

Mao (Jen Jen L) Wei-Wen  
Nip, Wai-Kit  
Peng, Ing-Chia  
Shieh, James J.  
Shih, Harry  
Soo, Hong-Ming  
Tang, Jiunn-Yann  
Tzeng, Chu H.  
Wan, Peter J.  
Wang, J.  
Wang, Ping-Lieh  
Wong, T. M.  
Wu, Rei-Young  
Wu, Ying Victor  
Yuen, Wing

#### Student Members:

Chang, Shang Hwei  
Chang, Yueh-Ing  
Chen, Hung-Chang  
Chen, I-Tsuen  
Chou, Chaur-Ming  
Chu, Caroline L. Y.  
Hsu, Shun-Yao

Huang, Maylee  
Leu, J. P. Romeo  
Lin, Chyi-Shen  
Lin, James C. C.  
Lin, Kuo Wei  
Lin, Sheree C. C.  
Sheu, Ming-Jen

Sheu, Shan-Shan  
Tsai, Wei-Yun  
Wei, Tsao-Ming  
Wen, Ming-Che  
Wu, Pei Feng  
Wu, Perry H.

*Merry Christmas*



*& Happy New Year*



愉快  
新年

**From: CAFS**

c/o Peter J. Wan  
Anderson Clayton Foods  
3333 N. Central Expressway  
Richardson, Texas 75080



**To:**

ANG, CATHARINA Y.W.  
110 Whiporwill Circle  
Athens, GA 30605

**Third Class**