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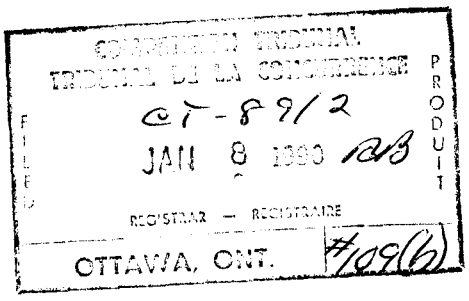



**EVIDENCE IN THE MATTER OF**

**THE DIRECTOR OF INVESTIGATION**

**AND RESEARCH AND**

**THE NUTRASWEET COMPANY UNDER**

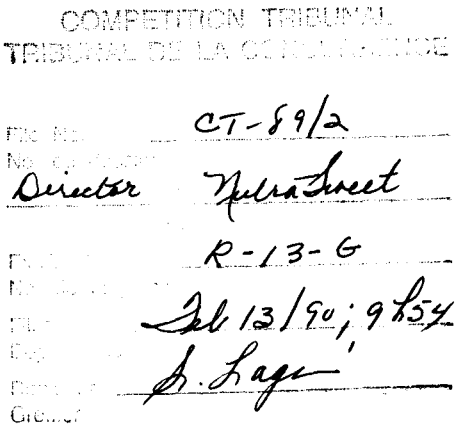
**SECTIONS 79 AND 77 OF**

**THE COMPETITION ACT**

Expert Evidence of

James Fry

Landell Mills Commodities Studies
Oxford



## J. Competition Between Aspartame and Other Sweeteners

1. There is a widespread belief among both the producers of nutritive sweeteners and outside observers that there is some displacement of demand for nutritive sweeteners by aspartame and other intense sweeteners. Nutritive sweetener producers in several countries have demonstrated the strength of their belief in such substitution by undertaking a number of campaigns to prevent or slow the granting of permission for the use of aspartame and other intense sweeteners in their home markets.

2. Outside observers who follow the sweetener sector closely have often published papers that support the view that different sweeteners compete with one another. Dr. W. Cromarty [whose assessments of the substitutability between sweeteners have been submitted in Schedule 10] has expressed such arguments on a number of occasions.

3. Several analysts have made estimates of the extent to which aspartame has captured or will capture sales from nutritive sweeteners. In 1983, for example, Eldib Associates of the US projected that aspartame would claim as much as one tenth of all HFCS sales to the carbonated soft drink industry in the United States by 1990. The following year, Abel, Daft and Earley, also of the United States, published an evaluation of the impact of aspartame upon US nutritive sweetener sales in 1984, and deduced that aspartame had displaced 70,000 short tons of white sugar. They also calculated that almost one fifth of all sales made by aspartame were at the expense of sucrose and HFCS.

4. In 1988, at the major European food industry exhibition, FIE, A. Gordon of GIRA, a European consultancy, presented estimates of the extent to which intense sweeteners would capture sales from sucrose in the EEC carbonated soft drink sector. By 1995, he put the total loss of sugar sales at 75,000 tonnes.

5. The interaction between the sales of competing sweeteners is inevitably quite complicated. Therefore, it is not surprising that there has not been complete unanimity regarding the results of economic analyses of sweetener consumption. For example, in a detailed study of US carbonated soft drink bottlers' demand for sweeteners in the period until 1986, we at LMC concluded that both diet and regular (nutritively-sweetened) soft drink sales were stronger after 1982 than would have been expected on the basis of relationships prevailing until 1982. The extremely heavy marketing and advertising expenditures committed by leading bottling companies during the intensification of the "Cola Wars" appeared to have boosted soft drink sales across the board.

6. In the next few paragraphs, we have used data that have become available since 1985 to prepare further analyses of the substitution between aspartame and other sweeteners in Canada, the United States and West Europe. The issue has been tackled in three different ways. First, we have undertaken a detailed analysis of the carbonated soft drink sectors in Canada and the United States in order to determine whether diet beverages have captured sales from nutritively-sweetened brands. Second, we have prepared an analysis of the table-top use of intense sweeteners. Third, we have used confidential data to evaluate the extent to which aspartame is used in blends with other intense sweeteners, in order to gauge how much scope exists for the substitution of these sweeteners for one another within products for which the use of blends is already taken for granted.

## A) Soft Drink Bottlers' Use of Sweeteners

### The USA

1. The National Soft Drink Association, whose data were used in our previous study of the carbonated soft drink sector, has stopped publishing the results of its annual survey of US soft drink production and consumption. Therefore, it is impossible to update the earlier econometric analysis of the division of US soft drink demand between the diet and non-diet segments.

2. To replace the NSDA data, we have used instead the series for packaged carbonated soft drinks published by Beverage Marketing$^{R}$. This excludes the sales of beverages for fountain syrups. These syrups were included in the NSDA series, but have not been collected by Beverage Marketing$^{R}$ until recently. The data used in the present analysis are summarised in Table 1 in Schedule 23.

3. As with the previous analysis, we started by estimating equations that included the price of coffee as a variable (to reflect the competition between soft drinks and coffee in the non-alcoholic beverage sector). However, whereas previously we had estimated our equations over the period from 1964 to 1982, the new equations have been estimated over the period from 1972 to 1981. The start date was dictated by the availability of information from Beverage Marketing$^{R}$. The new end date was chosen because Diet Coke$^{R}$ was launched - with the associated upsurge in promotional expenditures - in 1982 (see the data on advertising expenditures in Table 1 in Schedule 23), and therefore it appears that 1981, rather than 1982, marked the cut-off point between the "Old" and the "New" eras in soft drink marketing.

4. By far the best equation explaining the trend in nutritively-sweetened carbonated soft drink sales prior to 1981 is listed in Table 2 in Schedule 23. The equation does not include any term in the coffee price, but instead expresses soft drink demand solely as a function of the real Gross National Product, with a very high $R^2$ (Goodness of Fit) of 0.981.

5. Diagram 1 in Schedule 23 compares the actual levels of nutritively-sweetened soft drink sales until 1988 with the estimates prepared from the equation. Because the equation was derived from data covering the years from 1972 to 1981, the actual and estimated curves are very close to one another until 1981. It is interesting to note that the two curves remained close to one another until 1983, implying that the choice of 1981, rather than 1983, as the cut-off point for the estimates was of little importance.

6. After 1983, the two curves diverged. Actual sales of regular soft drinks fell increasingly far short of the levels forecast by the equation. In other words, there seems to have been a growing shortfall in the sales of regular soft drinks in relation to the path that would have been projected on the basis of data extending from 1972 to 1981 (or, as we noted above, with data extending until 1983).

7. The best equation explaining the expansion in the diet segment of the soft drink industry from 1972 to 1981 is listed in Table 3 in Schedule 23. Once again, there is no place for the price of coffee, and the demand for soft drinks is expressed solely as a function of the real GNP.

8. Diagram 2 in Schedule 23 uses this equation to prepare estimates and forecasts of the demand for diet beverages, and contrasts the projections with the actual volumes of diet soft drink sales from 1972 to 1988. The two curves move apart increasingly from 1982 onwards, as actual diet soft drink demand continually outstrips the

## Canada

1. Unfortunately the data available to us regarding the development of the soft drink sector in Canada are less comprehensive than those for the United States. The Government of Canada data that we have relied upon for the years from 1970 to 1980 covered every year apart from 1973, but presented the results of the Census of Manufacturing in a different form virtually every single year, forcing one to make informed estimates of the growth in the items covered only patchily.

2. After 1980, the data used to derive Table 7 in Schedule 23 were based upon A.C. Nielsen surveys of Food Stores, which provide only partial coverage of the overall demand for soft drinks. The Nielsen data were chain-linked to the earlier Government of Canada series to derive a final consistent set of statistics for analysis.

3. The absence of information for 1973 implies that the sales growth estimate for 1973 shown in Diagram 6 in Schedule 23 should be treated with caution. This explains why Table 7 in the same Schedule, describing the average annual rates of growth in nutritively-sweetened and total carbonated soft drink sales, extends back only as far as 1975 (since the growth rate in 1974 would have required knowledge of the 1973 data).

4. The figures in Table 7 reveal a marked contrast between the trend until 1981, when aspartame was approved for use in soft drinks, and that thereafter. From 1975 to 1981, the average annual growth in carbonated soft drink sales was 3.56% (with nutritively-sweetened soft drinks growing slightly faster than the average as a result of the restrictions on low calorie beverage sweeteners). This occurred alongside average annual growth of 3.00% in real private consumption spending, implying an income (or more correctly a private consumption) elasticity of demand of 1.186 (being 3.56 divided by 3.00).

5. From 1982 to 1988, total sales of carbonated soft drinks rose at an average rate of 4.53% per annum, while real private consumption spending increased by an annual 3.93%. This corresponds to an income elasticity of demand of 1.154.

6. The similarity in these simple measures of income elasticities suggests that the overall demand for soft drinks in Canada has developed since 1981 along much the same path as that traced out before 1981. If so, the advent of aspartame-sweetened diet beverages has made little contribution to the volume of soft drink sales as a whole.

7. The impact of the arrival of aspartame as a soft drink sweetener appears to have been felt mainly by nutritively-sweetened beverages. Their sales grew at an annual rate of only 2.32% from 1982 to 1988, after expanding at 3.73% per annum from 1975 to 1981.

## B. Table-Top Use of Intense Sweeteners

### The USA

1. Table 1 and Diagrams 1 and 2 in Schedule 24 describe the trends in US sales of table-top intense sweeteners from 1975 to 1988. The data are derived from A.C. Nielsen surveys of the food industry, and are therefore based upon partial coverage of the overall national consumption of intense table-top sweeteners. There is no reason to believe that there is a systematic bias in the patterns revealed by A.C. Nielsen's

# SCHEDULE 23

Table 1 : US Carbonated Soft Drink Packaged Sales

| | (Millions of gallons) | | | (% Share Diet) | Advertising Expenditures ($ millions) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Regular | Diet | Total | | Regular | Diet | (NSwt Diet) | Total | (% Diet) |
| 1972 | 3,825.0 | 378.3 | 4,203.3 | 9.0% | | | | | |
| 1973 | 4,048.3 | 400.4 | 4,448.7 | 9.0% | | | | | |
| 1974 | 4,025.7 | 398.1 | 4,423.8 | 9.0% | | | | | |
| 1975 | 4,104.9 | 456.1 | 4,561.0 | 10.0% | | | | | |
| 1976 | 4,591.1 | 567.4 | 5,158.5 | 11.0% | | | | | |
| 1977 | 4,961.8 | 676.6 | 5,638.4 | 12.0% | | | | | |
| 1978 | 5,319.2 | 704.8 | 6,024.0 | 11.7% | | | | | |
| 1979 | 5,460.3 | 844.9 | 6,305.2 | 13.4% | | | | | |
| 1980 | 5,650.9 | 904.7 | 6,555.6 | 13.8% | | | | | |
| 1981 | 5,771.9 | 1,018.6 | 6,790.5 | 15.0% | | | | | |
| 1982 | 5,729.8 | 1,257.8 | 6,987.6 | 18.0% | 178.9 | 71.8 | 0.0 | 250.7 | 28.6% |
| 1983 | 5,654.9 | 1,689.1 | 7,344.0 | 23.0% | 192.4 | 127.2 | 11.7 | 319.6 | 39.8% |
| 1984 | 5,821.8 | 1,930.3 | 7,752.1 | 24.9% | 203.0 | 162.6 | 124.2 | 365.6 | 44.5% |
| 1985 | 5,996.9 | 2,196.6 | 8,193.5 | 26.8% | 234.3 | 145.1 | 117.1 | 379.4 | 38.2% |
| 1986 | 6,198.3 | 2,359.1 | 8,557.4 | 27.6% | 267.9 | 121.5 | 108.6 | 389.4 | 31.2% |
| 1987 | 6,433.6 | 2,500.3 | 8,933.9 | 28.0% | 267.8 | 121.3 | 120.6 | 389.2 | 31.2% |
| 1988 | 6,691.7 | 2,718.8 | 9,410.5 | 28.9% | | | | | |

Source: Beverage Marketing, A.C. Nielsen

Diagram 1

Actual and Forecast Regular CSD Demand
in the US (estimated from 1972 to 1981)

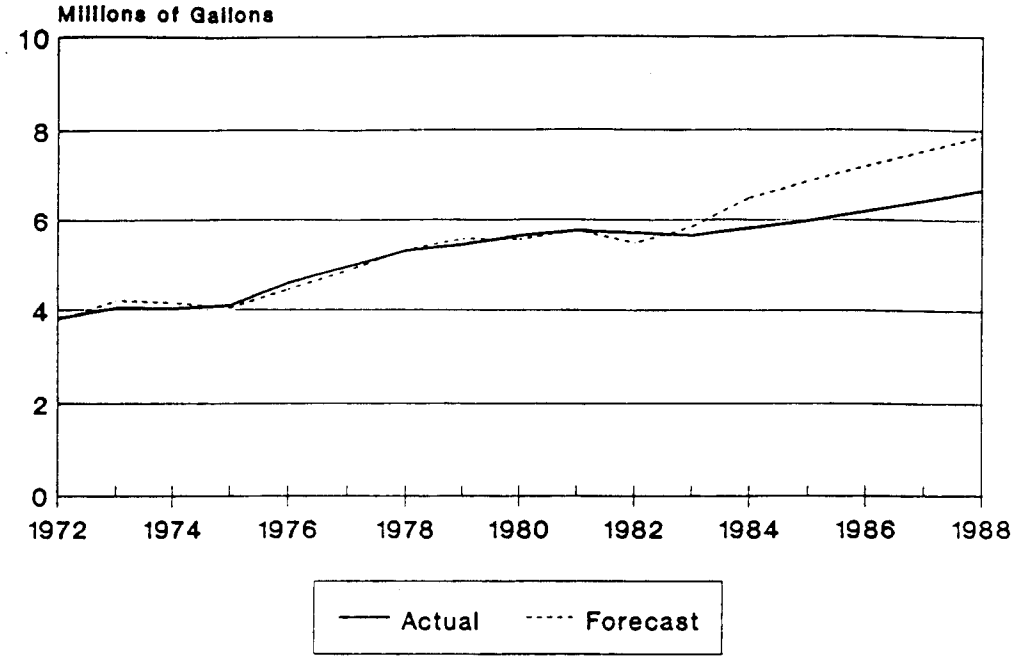



Diagram 2

Actual and Forecast Diet CSD Demand
in the US (estimated from 1972 to 1981)

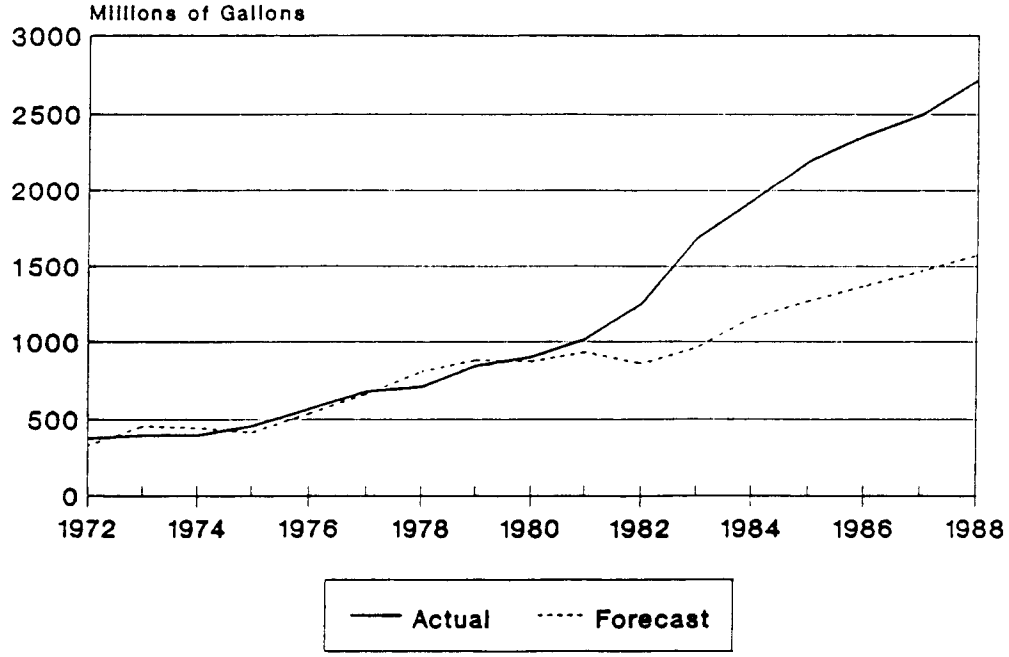


Table 4 : Percentage of Households Who Are Non-Alcoholic Beverage Drinkers By Household Income - 1983

| Annual Household Income Category | $40,000 & Over | $30,000 & Over | $25,000 & Over | $20,000 $24,999 | $15,000 $19,999 | $10,000 $14,999 | Under $10,000 |
|---|---|---|---|---|---|---|---|
| Soft Drinks | | | | | | | |
| Regular Cola | 62.5% | 64.1% | 64.6% | 69.7% | 65.5% | 63.1% | 62.0% |
| Other Regular Carbonated | 55.7 | 58.0 | 58.0 | 57.4 | 57.2 | 54.4 | 51.0 |
| Diet Cola | 40.1 | 38.9 | 38.4 | 35.0 | 35.7 | 31.7 | 28.2 |
| Other Diet Carbonated | 32.9 | 32.6 | 32.4 | 30.0 | 27.9 | 29.5 | 25.1 |
| Powdered | 38.1 | 42.3 | 44.2 | 47.2 | 44.6 | 39.0 | 37.0 |
| Fruit Juices | | | | | | | |
| Orange Juice | 43.0% | 42.4% | 43.9% | 42.6% | 44.0% | 47.7% | 45.1% |
| Other Fruit Juices | 64.8 | 64.1 | 64.1 | 63.9 | 60.5 | 58.9 | 51.0 |
| Milk | 87.6% | 88.6% | 88.7% | 89.7% | 88.5% | 88.3% | 86.3% |
| Coffee | | | | | | | |
| Ground | 67.6% | 67.7% | 66.9% | 62.5% | 61.3% | 54.3% | 49.0% |
| Caffeinated Instant and Freeze Dried | 34.2% | 33.5% | 34.0% | 29.9% | 33.9% | 36.6% | 32.1% |
| Decaffeinated Instant and Freeze Dried | 42.4% | 42.8% | 41.3% | 39.2% | 37.7% | 38.2% | 41.9% |
| Miscellaneous | | | | | | | |
| Bottled Water | 15.8% | 14.3% | 13.5% | 10.0% | 12.1% | 7.8% | 6.9% |

Table 6 : Changes in the Percentages of Households Who Are Non-Alcoholic Beverage Drinkers By Household Income Between 1983 and 1984

| Annual Household Income Category | $40,000 & Over | $30,000 & Over | $25,000 & Over | $20,000 $24,999 | $15,000 $19,999 | $10,000 $14,999 | Under $10,000 |
|---|---|---|---|---|---|---|---|
| Soft Drinks | | | | | | | |
| Regular Cola | -2.5% | -1.3% | -1.1% | -3.0% | -0.1% | 2.9% | 0.4% |
| Other Regular Carbonated | -0.2 | -1.9 | -1.9 | -0.9 | -2.2 | 0.7 | -1.3 |
| Diet Cola | 9.2 | 8.3 | 7.7 | 3.2 | 2.2 | 3.2 | 0.2 |
| Other Diet Carbonated | 4.4 | 3.2 | 2.6 | 0.2 | 1.8 | -0.4 | -1.1 |
| Powdered | 7.1 | 4.2 | 2.7 | -5.3 | -0.4 | 4.4 | -0.5 |
| Fruit Juices | | | | | | | |
| Orange Juice | 6.6% | 7.4% | 5.3% | 4.4% | 1.9% | 2.2% | 1.9% |
| Other Fruit Juices | 6.7 | 5.3 | 4.3 | -0.2 | 0.1 | 1.8 | 2.0 |
| Milk | 4.7% | 3.1% | 3.3% | 0.3% | 0.0% | 2.1% | -1.3% |
| Coffee | | | | | | | |
| Ground | 2.5% | 1.4% | 1.4% | -3.5% | -6.2% | 0.3% | -3.8% |
| Caffeinated Instant and Freeze Dried | 7.7% | 4.5% | 4.3% | 4.8% | 2.7% | -1.2% | 3.3% |
| Decaffeinated Instant and Freeze Dried | 1.2% | -0.9% | 0.3% | -3.8% | 2.1% | 0.6% | -2.6% |
| Miscellaneous | | | | | | | |
| Bottled Water | 1.5% | 1.2% | 0.8% | 1.8% | 0.4% | 1.1% | 2.5% |

Table 7 : Annual Growth in Canadian Carbonated Soft Drink Consumption

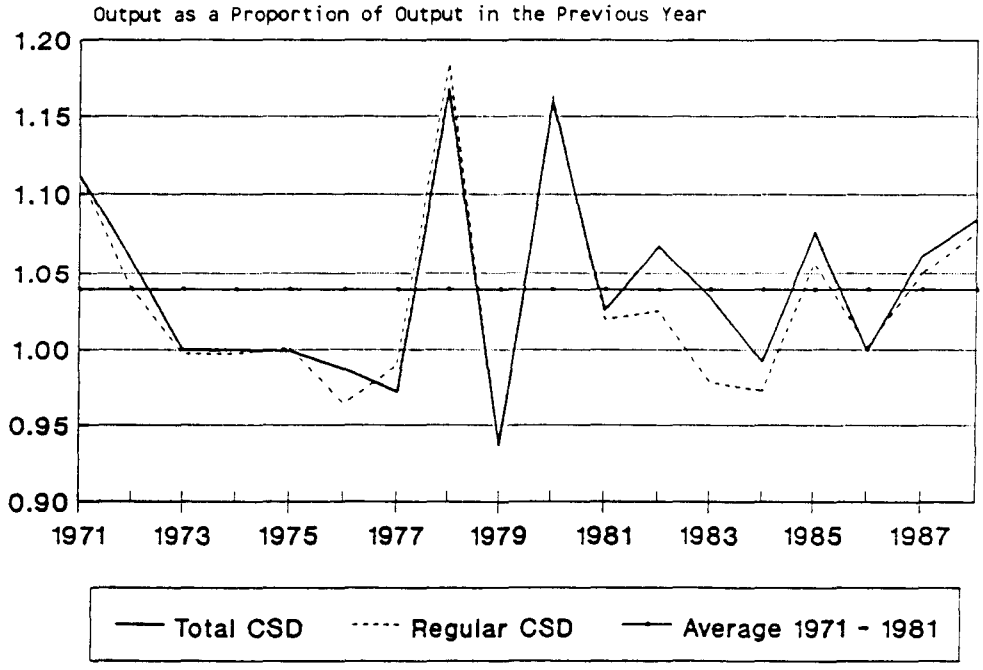
(Percentage)

| | Total CSD Sales | Non-Diet CSD Sales | Real Private Consumption |
|---|---|---|---|
| 1975 - 1981 | 3.56% | 3.73% | 3.00% |
| 1982 - 1988 | 4.53% | 2.32% | 3.93% |

Source: A.C. Nielsen, Canadian Government Censuses of Industrial Production

**Diagram 6**

**Annual Growth in Canadian Soft Drink Production**



# SCHEDULE 24

Table 1 : US Table-Top Sweetener Sales

Billions of Equivalent Teaspoons

| | Overall Total | Equal | Other Brands |
|---|---|---|---|
| 1975 | 28.10 | 0.00 | 28.10 |
| 1976 | 26.30 | 0.00 | 26.30 |
| 1977 | 30.60 | 0.00 | 30.60 |
| 1978 | 22.30 | 0.00 | 22.30 |
| 1979 | 27.20 | 0.00 | 27.20 |
| 1980 | 28.60 | 0.00 | 28.60 |
| 1981 | 29.40 | 0.00 | 29.40 |
| 1982 | 28.75 | 0.49 | 28.27 |
| 1983 | 30.95 | 4.46 | 26.49 |
| 1984 | 32.52 | 6.66 | 25.86 |
| 1985 | 31.61 | 7.55 | 24.06 |
| 1986 | 29.79 | 7.28 | 22.51 |
| 1987 | 28.42 | 6.74 | 21.68 |
| 1988 | 28.50 | 6.69 | 21.81 |

Source: Derived from Progressive Grocer/Chain Store Age, A.C. Nielsen

Table 2 : Canadian Table-Top Intense Sweetener Sales ('000 teaspoons)

| | Total Table-Top | Equal | Sugar Twin | | Sweet 'N Low | | Sucaryl | Other Brands | Total Table-Top | | Advertising (C$'000) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Aspartame | Other | Aspartame | Other | | | Aspartame | Other Sweeteners | Sugar Twin | Equal |
| 1982 | 18,434 | 1,290 | 0 | 5,751 | 0 | N/A | N/A | N/A | 1,290 | 17,144 | N/A | N/A |
| 1983 | 18,620 | 2,328 | 0 | 6,033 | 0 | N/A | 3,985 | N/A | 2,328 | 16,292 | N/A | N/A |
| 1984 | 18,868 | 3,189 | 0 | 6,170 | 0 | 1,698 | 3,642 | 4,189 | 3,189 | 15,679 | 43 | 656 |
| 1985 | 19,038 | 3,674 | 0 | 6,587 | 0 | 1,580 | 3,275 | 3,922 | 3,674 | 15,364 | 0 | 952 |
| 1986 | 18,854 | 3,714 | 0 | 6,599 | 0 | 1,565 | 3,394 | 3,582 | 3,714 | 15,140 | 23 | 333 |
| 1987 | 18,538 | 4,077 | 278 | 6,451 | 0 | 1,650 | 2,725 | 3,355 | 4,355 | 14,183 | 461 | 705 |
| 1988 | 17,927 | 4,267 | 484 | 6,346 | 36 | 1,524 | 2,097 | 3,245 | 4,787 | 13,140 | 473 | 738 |

Source: A.C. Nielsen

Diagram 1

Table-Top Sweetener Sales in the USA

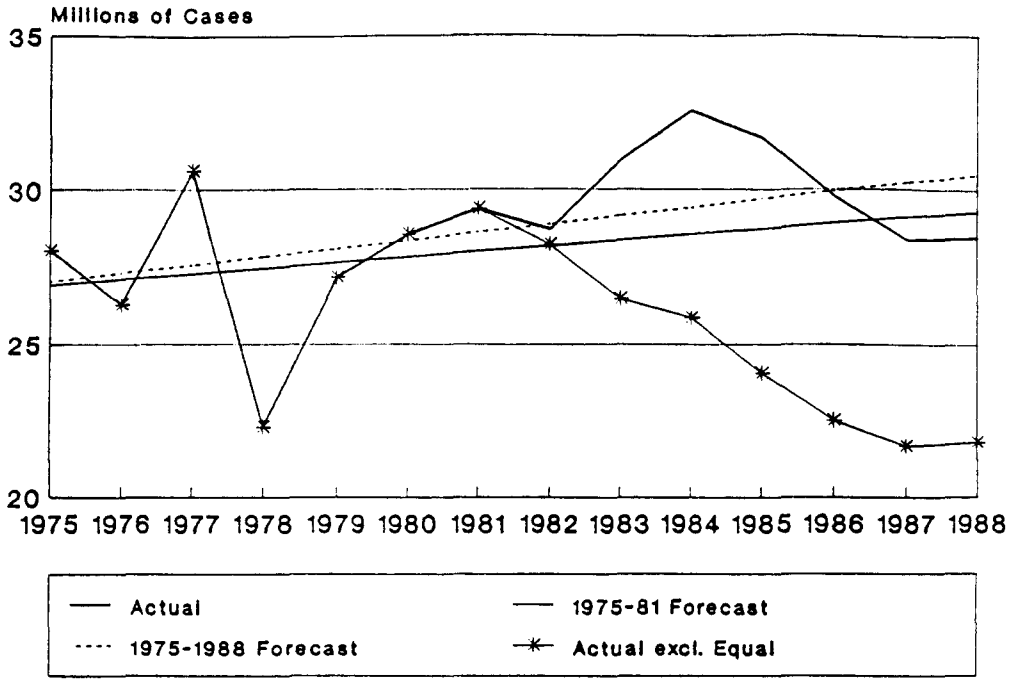
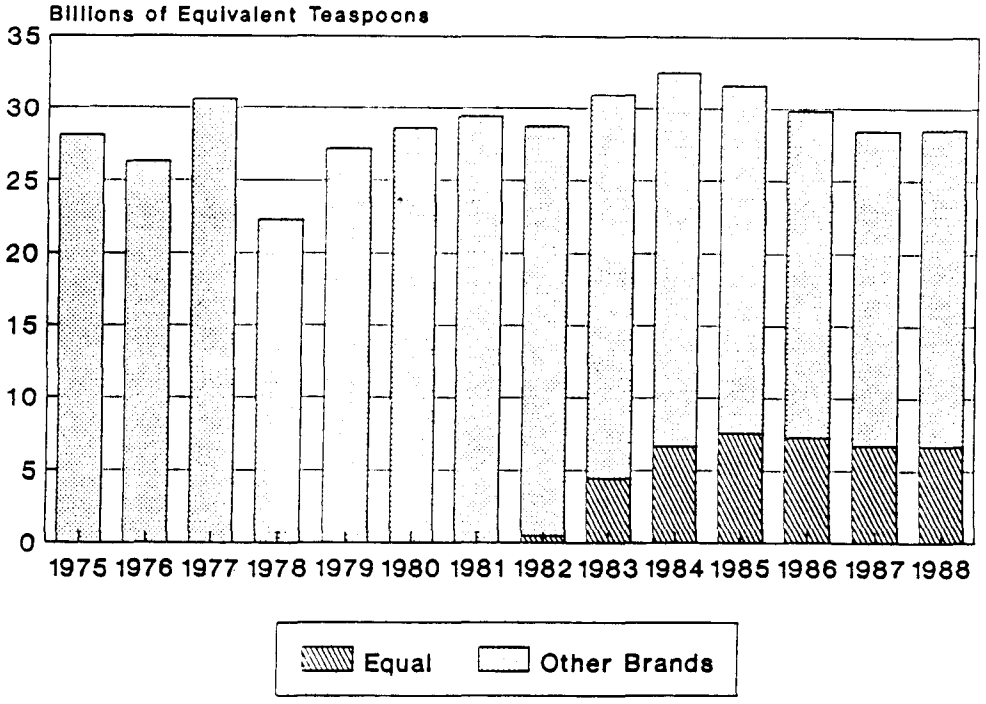


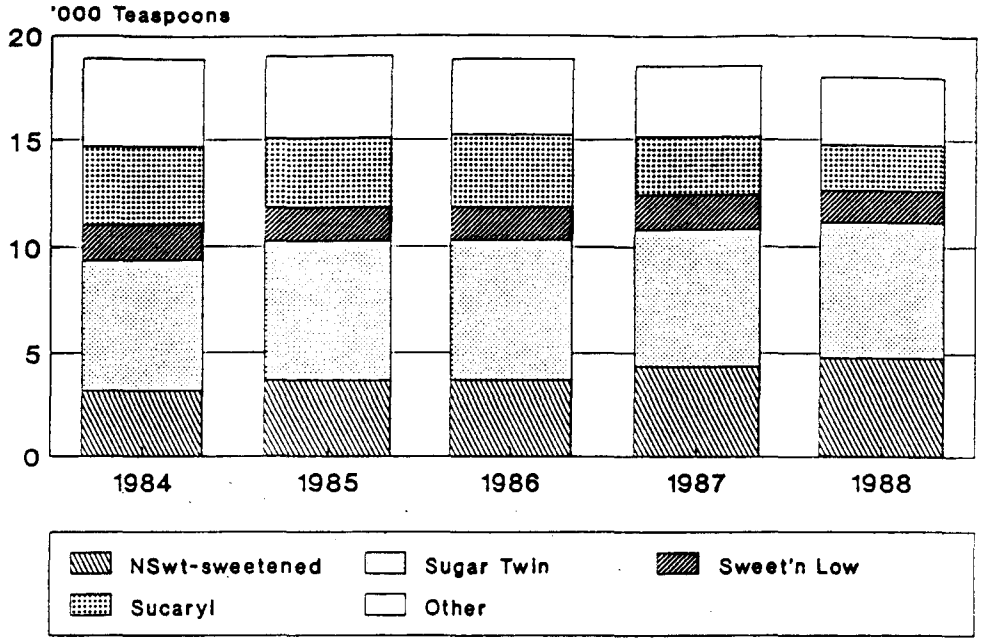

Diagram 2

US Intense Table-Top Sweetener Sales



## Diagram 3

## Canadian Table-Top Consumption
## By Brand



SCHEDULE 25