Show Them What's Important: Solutions for a Finite Workday in an Era of Information Overload

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Abstract & Introduction
The biggest obstacle to information delivery and assimilation is the volume of information available. Dilbert reported that when he computed the total time spent waiting for web pages to load, he found that it wiped out all the productivity gains of the Information Age. This is a tutorial about design and construction of data presentation for effective communication. It covers concepts, examples, and innovations for making best use of those precious resources: the time and attention of your information recipients/users, and your own time and effort to package and deliver information. The tutorial shows how to emphasize, order, rank, and subset information, and how to handle the viewer's concerns when presenting partial information. Though the presentation includes statistical maps, space does not permit their inclusion in this paper. Solutions use base SAS®, SAS/GRAPH®, and SAS macros, and are platform independent. See also my Invited Poster "Visual Communication Art & Science: The Design Guide and Gallery for Clear, Convincing Graphs, Tables, Maps, and Text".

Pulitzer's first rule for journalists was: "Put it before them briefly so they will read it."

Text Parts of Graphs
Avoid providing the same information in multiple places. Omit axis labels when that information is either self-evident from tickmark labels (e.g., when they are dates) or is mentioned in the title or subtitle. Make the graph title a headline. State the message or meaning of the graph, rather than simply provide an uninspiring statement of graph content or subject.

"First Things First"
The cover for a past issue of Ora-dot-com said, "The intelligence of a civilization can be measured by its ability to prioritize information."

Textual Reports
The design of a newspaper article, like that below for a data report, permits the reader to stop at any point, and get the most valuable information in the shortest time, in a progression of decreasing importance. If the reader reads only the headline, she/he gets the essence in the fewest words. The subheadline expands on the headline. The first paragraph is a one or few sentence summary. Subsequent paragraphs provide more information of progressively less importance.

Sequencing Information in a Report
The first page should be an Exception Report (Exhibit 3). To monitor actual measurements versus goals or thresholds, any exceptions must be on Page 1 if hardcopy, or selectable as Option 1 if online. All exceptions should be on the same page/screen, even if the items are unrelated. The user may not bother to look further if everything is OK.

The second page should be a Summary Report (Exhibit 4).

If the report includes trend charts and/or historical tables, there should be a one-page summary to show all the current report-month (or report-week or report-day) critical values.

Then, everything else follows.

Sequencing Information in a Table, List, or Graph
To provide a tool for rapid identification and assessment of categories of significance, order table or graph entries by decreasing value of the measurement of interest. (Exhibits 5, 6, 7, 10, 11)

To provide an all-encompassing look-up tool for a large set of categories, order table or graph entries alphabetically by category name.

“Let Part Stand for the Whole”
Somewhere I read the above recommendation for effective communication. I cannot cite the published source. The point is that often, if not almost always, the essence or the most significant is enough. And, if more turns out to truly be desired, it can be supplied on demand, rather than as routine.

Subset Ranking Reports
Focus attention on high-impact categories. Often the high-ranking categories that can be fit on one page account for SO-99% of the total of the measurement of interest, even if the full list of categories would run to several pages.

Limit the list. Show only: (a) Top 10, Top 40, Top NN, etc. (Exhibit 5); and/or (b) values above a minimum cut-off (Exhibit 6). See Exhibits 5A, 6A, and 8 for the programs and the TOPNN macro. When limiting the list, provide a subtitle that your program (in my case, the TOPNN macro) automatically loads with a statement of what percent of the total for all observations is accounted for by the Top NN observations listed in the ranking report.

Nested Ranking Report (Exhibit 7)
The Nested Ranking Report includes all the observations, not just the Top NN or those that are above a specified minimum. It is used when the observations belong to a CLASS and a SUBCLASS. The RANKNEST macro assumes that the response (or RANKVAR) has already been summed to the SUBCLASS level. See Exhibits 7A and 9 for the program and macro. You can generalize the macro to sum the response at the SUBCLASS level.
### 1991 Club Sports Revenues, By Month

**Peak in August**

$151,894

<table>
<thead>
<tr>
<th>Month</th>
<th>Bocce</th>
<th>Croquet</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan</td>
<td>$62,188</td>
<td>$73,962</td>
<td>$136,150</td>
</tr>
<tr>
<td>Feb</td>
<td>$27,920</td>
<td>$85,079</td>
<td>$112,999</td>
</tr>
<tr>
<td>Mar</td>
<td>$59,741</td>
<td>$91,144</td>
<td>$150,885</td>
</tr>
<tr>
<td>Apr</td>
<td>$57,467</td>
<td>$92,639</td>
<td>$150,106</td>
</tr>
<tr>
<td>May</td>
<td>$42,691</td>
<td>$101,361</td>
<td>$144,052</td>
</tr>
<tr>
<td>Jun</td>
<td>$35,896</td>
<td>$105,319</td>
<td>$141,215</td>
</tr>
<tr>
<td>Jul</td>
<td>$38,653</td>
<td>$99,411</td>
<td>$137,949</td>
</tr>
<tr>
<td>Aug</td>
<td>$43,038</td>
<td>$108,856</td>
<td>$151,894</td>
</tr>
<tr>
<td>Sep</td>
<td>$38,444</td>
<td>$99,006</td>
<td>$137,450</td>
</tr>
<tr>
<td>Oct</td>
<td>$40,296</td>
<td>$104,507</td>
<td>$144,803</td>
</tr>
<tr>
<td>Nov</td>
<td>$40,201</td>
<td>$110,826</td>
<td>$151,027</td>
</tr>
<tr>
<td>Dec</td>
<td>$32,776</td>
<td>$98,928</td>
<td>$131,704</td>
</tr>
</tbody>
</table>

**Exhibit 14. Sparse Annotation: Chart for Peak, Trend, & Visual Comparison with Detail Supplied in Table Below**
At the end of the report, the grand total response is listed. For PAGEBY=YES, the report starts a new page every time the CLASS changes.

Nested Banking provides a natural drill-down" from a simple CLASS level summary report.

Ranking Shares of the Whole When Numerous:
Annotated Banked Horizontal Bar Chart (Exhibit 10)

When the shares of the whole are too numerous or too small, there may not be room to display pie slice name, value, and percent of whole. The annotated ranked horizontal bar chart is a feasible solution. (See Exhibits 10A and 10B for the program and macro.) In any case, an ordered horizontal bar chart is a good way to compare response across categories, especially when you do not want to show percent of whole.

Ranking Shares of the Whole When Few:
New, Improved Pie Chart (Exhibit 11)

When the shares of the whole are few or moderate in number, the best alternative is my New, Improved Pie Chart. For how to create it, see my paper "Reinventing the Pie Chart: Improved and Reliable Communication for This Popular Business Chart" in Proceedings of the Twentieth Annual SAS Users Group International Conference (SAS Institute Inc., Cary, NC, 1995).

Summarizing Shares of the Whole into Two:
Power of the Pac-Man Pie Chart (Exhibits 1 & 2)

The idea of a two-part pie chart may seem trivial, if not silly. But when the share of interest to your message is either tiny or huge, the image is very "impactful" and, therefore, memorable.

In the case of Exhibit 2, you can easily satisfy any curiosity about "Other" with a table displayed below the pie chart. But it is essential to not blunt the visual message by splitting the big wedge into a lot of little ones that may be as small as or smaller than the wedge whose smallness you wish to emphasize.

Author and Belated Work in Progress

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Born to See, Meant to Look
- Faust

Dr. LeRoy Bessler is a SAS consultant, and frequent speaker, with interests in visual communication, graphic design, information visualization, color, InfoGeographics, and Software-Intelligent Application Development.

An award winner for papers on graphic design and visual communication, Dr. Bessler is writing a book to be published by SAS Institute, titled "Chart Smart: Design Guide and Solution Toolkit for SAS Graphs, Tables, and Maps That Inform and Influence".

IBM Mainframe Data Analysis Software
Market Shares

SAS - 91%

Source: Computer intelligence, 1993
Exhibit 1. Pac-Man Pie Chart

Allocation of Personal Time
("Other" Probably Exaggerated)

Other

Fun - 9%

Source: Ascetic Life, 1 April 1997
Exhibit 2. The Other Pac-Man
Ralph's Grocery Store
Exceptions - March 1992

<table>
<thead>
<tr>
<th>Exception</th>
<th>Actual Value</th>
<th>Goal or Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grocery Returns (% of sales)</td>
<td>2.30</td>
<td>1</td>
</tr>
<tr>
<td>Employee Hours Late or Absent (% of scheduled)</td>
<td>3.03</td>
<td>1</td>
</tr>
</tbody>
</table>

If no exceptions listed, then no goals missed, no thresholds reached.

**Exhibit 3. Exception Report**

Ralph's Grocery Store
Summary - March 1992

- Sales: $14,153
- Operating Costs (Rent, Utilities, Etc.): $1,139
- Returns: $326
- Store Open Hours: 264
- Employee Hours Scheduled: 528
- Employee Hours Worked: 512
- Employee Hours Late or Absent: 16

For history, see appropriate graphs elsewhere in this report.

**Exhibit 4. Summary Report (Headings suppressed with LABEL var='00'X)**
Exhibit 5. Top 10 Ranking Report

```
XTOPN(Data=INDATA,
   ClassVar=SASPROC,
   CVARLabl='PROC',
   RANKVar=COUNT,
   RVARLabl='Count',
   WW=10,
   TTLText=SAS PROCs Used From 12-01-93 To 01-31-95)
```

Run;

Exhibit 5A. Program for Exhibit 5

Exhibit 6. Ranking Report With Cutoff

```
XTOPN(Data=INDATA,
   ClassVar=SASPROC,
   CVARLabl='PROC',
   RANKVar=COUNT,
   RVARLabl='Count',
   WW=10,
   TTLText=SAS PROCs Used From 12-01-93 To 01-31-95)
```

Run;

Exhibit 6A. Program for Exhibit 6

Exhibit 7. Nested Ranking Report

```
XTOPN(Data=INDATA,
   ClassVar=SASPROC,
   CVARLabl='PROC',
   RANKVar=COUNT,
   RVARLabl='Count',
   WW=10,
   TTLText=SAS PROCs Used From 12-01-93 To 01-31-95)
```

Run;

Exhibit 7A. Program for Exhibit 7
Exhibit 8. TOPNN Macro

``` SAS 
%MACRO TOPNN(data=, classvar=, cvarlabel=, rankvar=, rvarlabel=, var=, minvar=, title=); 
DATA: 
SET data=; 
XGLOBAL BELLOWMIN: 
IF N=1 THEN CALL SYMPUT('BELOWMIN', 'N'); 
IF N=MINVAR => THENDO: 
IF BMINVAR < MINVAR 
THEN RETURN; 
ELSE DO: 
CALL SYMPUT('BELOWMIN', 'V'); 
DELETE j; 
END; 
KEEP CLASSVARBRANKVAR; 
RUN; 
PROC SORTOUT=FORTOPN; 5 DESCENDING SRANKVAR; 
RUN; 
DATA TOREPORT; 
SET FORTOPN; 
IF N < BMIN => 
RANK = _N_; 
RUN; 
PROC MEANS DATA=DATA NOPRINT SUM N; 
VAR BMINVAR; 
OUTPUT OUT=TOPN SUM=N NTOT=SUMTDT; 
RUN; 
PROC MEANS DATA=DATA TOREPORT NOPRINT SUM N; 
VAR BMINVAR; 
OUTPUT OUT=TOPN WITH=SUMN NTOT=SUMTDT; 
RUN; 
DATA NULL; 
MERGE ALL TOPN; 
FORMAT PCTTDT 5.11; 
PCTTDT = ROUND(((SSUMN = SUMNTOT) .1)); 
XGLOBAL RANKLEN; 
CALL SYMPUT('RANKLEN', LENGTH(N)); 
XGLOBAL RANK: 
IF BMINVAR < N 
THEN CALL SYMPUT('MIN', TRIM(LEFTP( BMINVAR, BVARFMT)))))); 
XGLOBAL PTOTT; 
CALL SYMPUT('PTOTT', TRIM(LEFT(PTOTT))); 
XGLOBAL HTTLMIN; 
FORMAT: TTLTOPM 8.4.1; 
IF NTOT < NTOT AND NTOT = BMIN 
THEN DO: 
TITLPNM = 'Top N'; 
CALL SYMPUT('HTTLMIN', 'V'); 
ELSE DO: 
TITLPNM = 'Ranked List'; 
IF BMINVAR = N OR 'BELOWMIN' = 'V' 
THEN CALL SYMPUT('HTTLMIN', 'V'); 
ELSE CALL SYMPUT('HTTLMIN', 'V'); 
END; 
XGLOBAL TTLTOPM; 
CALL SYMPUT('TITLPNM', TRIM(TITLPNM)); 
RUN; 
OPTIONS MISSING=' ' * NODATE NONUMBER; 
PROC PRINTDATA=TOPERPT MOBSU LABEL SPLIT='*'; 
FORMAT RANK BCLASSVAR = BVARFMT; 
LABEL BCLASSVAR = BVA; 
VAR BCLASSVAR BVARFMT; 
SUM BVARFMT; 
TITLE1 = 'RANKBCLASSVAR'; 
TITLE1 = TRIM(LEFT('VALUES FOR BY BCLASSVAR OF the total')); 
XMACRO TTLTOPM; 
TITLPNM = 'X REPT'; 
TITLE1 = 'VALUES ONLY THAN XREPT'; 
END; 
XHEND TTLMIN; 
ATLNN; 
RUN; 
XHEND TOPN; 
```

Exhibit 9. RANKNEST Macro

``` SAS 
%MACRO RANKNEST(data=, class=, subclass=, rankvar=, rvarlabel=, var=, minvar=, title=, pageby='YES'; 
DATA NULL; 
SET = DATA END=LAST; 
XGLOBAL CLASSLEN; 
RETAIN CLASSLEN =: 
CLASSLEN = MAX(CLASSLEN, LENGTH(class)); 
IF LAST THEN CALL SYMPUT('CLASSLEN', CLASSLEN); 
RUN; 
PROC SORT DATA=DATAOUT=SORTI; 
BY BCLASS; 
RUN; 
PROC MEANS DATA=DATA NOPRINT SUM N; 
BY BCLASS; 
VAR BMINVAR; 
OUTPUT OUT=SUMMEDSUM=BMINVAR N=CLASSSIZE; 
RUN; 
PROC MEANS DATA=DATA SUMMED NOPRINT; 
VAR BMINVAR; 
OUTPUT OUT=COUNTED=N=CLASSSIZE; 
RUN; 
DATA NULL; 
SET COUNTED; 
XGLOBAL RANKLEN; 
CALL SYMPUT('RANKLEN', LENGTH(N=CLASSSIZE)); 
RUN; 
PROC SORT DATA=SUMMED OUT=SORT2; 
5 DESCENDING BMINVAR; 
RUN; 
DATA RANKDATA; 
SET SORT2; 
LENGTH RANK & BMINVAR; 
RANK = RANK + TRUNCATE((RANK + BMINVAR)); 
XLE Y RANKLEN + TRUNCATE((BMINVAR + ALLCLASSLEN + 2)); 
LENGTH RANKCLASS & RANKLEN; 
RANKCLASS = TRUNCATE((BMINVAR)); 
RANK = TRUNCATE((BMINVAR)); 
KEEP BCLASSBCLASS; 
RUN; 
PROC SORT DATA=RANKDATADATOUT=SORT2; 
5 DESCENDING BMINVAR; 
RUN; 
DATA MERGED; 
MERGE SORTS SORTI; 
5 BCLASS; 
KEEP RANKCLASSSUBCLASSBMINVAR; 
RUN; 
PROC SORT DATA=MERGED OUT=TOPPRINT; 
5 BCLASS DESCENDING BMINVAR; 
RUN; 
OPTCNB MISSING=' ' * NODATE NONUMBER; 
PROC PRINTDATA=TOPERPT MOBSU LABEL SPLIT='*'; 
XIF SPAGEBY = 'YES THEN XDO; 
PAGEBY RANKCLASS; 
XEND; 
BY RANKCLASS; 
ID RANKCLASS; 
VAR SUBCLASSBMINVAR; 
SUM BMINVAR; 
FORMAT BMINVAR BVARFMT; 
LABEL RANKCLASS+RANK+ALLCLASSBL; 
LABEL SUBCLASS+SUBCLASSBL; 
LABEL BCLASSBCLASS; 
RUN; 
XHEND RANKNEST; 
```
State and Local Government Employment By State In October 1991

State Name, Percent of USA Total, and Employee Count

<table>
<thead>
<tr>
<th>State</th>
<th>Percent of USA Total</th>
<th>Employee Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>California</td>
<td>10.9%</td>
<td>1,429,149</td>
</tr>
<tr>
<td>New York</td>
<td>8.6%</td>
<td>1,123,044</td>
</tr>
<tr>
<td>Texas</td>
<td>7.2%</td>
<td>951,388</td>
</tr>
<tr>
<td>Florida</td>
<td>5.0%</td>
<td>657,460</td>
</tr>
<tr>
<td>Illinois</td>
<td>4.3%</td>
<td>565,158</td>
</tr>
<tr>
<td>Ohio</td>
<td>4.0%</td>
<td>530,147</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>3.7%</td>
<td>485,736</td>
</tr>
<tr>
<td>Michigan</td>
<td>3.7%</td>
<td>480,402</td>
</tr>
<tr>
<td>New Jersey</td>
<td>3.2%</td>
<td>417,913</td>
</tr>
<tr>
<td>Georgia</td>
<td>2.9%</td>
<td>383,290</td>
</tr>
<tr>
<td>North Carolina</td>
<td>2.7%</td>
<td>360,844</td>
</tr>
<tr>
<td>Virginia</td>
<td>2.6%</td>
<td>338,478</td>
</tr>
<tr>
<td>Indiana</td>
<td>2.2%</td>
<td>288,789</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>2.1%</td>
<td>278,831</td>
</tr>
<tr>
<td>Washington</td>
<td>2.0%</td>
<td>266,290</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>1.9%</td>
<td>256,022</td>
</tr>
<tr>
<td>Tennessee</td>
<td>1.9%</td>
<td>249,897</td>
</tr>
<tr>
<td>Missouri</td>
<td>1.9%</td>
<td>246,434</td>
</tr>
<tr>
<td>Maryland</td>
<td>1.9%</td>
<td>245,953</td>
</tr>
<tr>
<td>Louisiana</td>
<td>1.9%</td>
<td>244,064</td>
</tr>
<tr>
<td>Minnesota</td>
<td>1.8%</td>
<td>235,058</td>
</tr>
<tr>
<td>Alabama</td>
<td>1.8%</td>
<td>232,437</td>
</tr>
<tr>
<td>South Carolina</td>
<td>1.5%</td>
<td>200,233</td>
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<tr>
<td>Kentucky</td>
<td>1.5%</td>
<td>195,563</td>
</tr>
<tr>
<td>Arizona</td>
<td>1.4%</td>
<td>189,447</td>
</tr>
<tr>
<td>Colorado</td>
<td>1.4%</td>
<td>185,912</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>1.4%</td>
<td>185,106</td>
</tr>
<tr>
<td>Iowa</td>
<td>1.2%</td>
<td>164,052</td>
</tr>
<tr>
<td>Oregon</td>
<td>1.2%</td>
<td>157,642</td>
</tr>
<tr>
<td>Connecticut</td>
<td>1.2%</td>
<td>155,718</td>
</tr>
<tr>
<td>Kansas</td>
<td>1.2%</td>
<td>154,745</td>
</tr>
<tr>
<td>Mississippi</td>
<td>1.2%</td>
<td>151,964</td>
</tr>
<tr>
<td>Arkansas</td>
<td>0.9%</td>
<td>123,132</td>
</tr>
<tr>
<td>New Mexico</td>
<td>0.8%</td>
<td>100,602</td>
</tr>
<tr>
<td>Nebraska</td>
<td>0.7%</td>
<td>98,219</td>
</tr>
<tr>
<td>West Virginia</td>
<td>0.7%</td>
<td>91,332</td>
</tr>
<tr>
<td>Utah</td>
<td>0.7%</td>
<td>90,727</td>
</tr>
<tr>
<td>Maine</td>
<td>0.5%</td>
<td>64,582</td>
</tr>
<tr>
<td>Hawaii</td>
<td>0.5%</td>
<td>64,390</td>
</tr>
<tr>
<td>Nevada</td>
<td>0.5%</td>
<td>62,680</td>
</tr>
<tr>
<td>Idaho</td>
<td>0.4%</td>
<td>57,164</td>
</tr>
<tr>
<td>Montana</td>
<td>0.4%</td>
<td>52,006</td>
</tr>
<tr>
<td>New Hampshire</td>
<td>0.4%</td>
<td>51,046</td>
</tr>
<tr>
<td>Rhode Island</td>
<td>0.4%</td>
<td>46,670</td>
</tr>
<tr>
<td>Alaska</td>
<td>0.3%</td>
<td>43,978</td>
</tr>
<tr>
<td>South Dakota</td>
<td>0.3%</td>
<td>38,054</td>
</tr>
<tr>
<td>Delaware</td>
<td>0.3%</td>
<td>36,997</td>
</tr>
<tr>
<td>Wyoming</td>
<td>0.3%</td>
<td>35,780</td>
</tr>
<tr>
<td>North Dakota</td>
<td>0.3%</td>
<td>35,581</td>
</tr>
<tr>
<td>Vermont</td>
<td>0.2%</td>
<td>30,236</td>
</tr>
</tbody>
</table>

USA Total = 13,130,342

Exhibit 10. Annotated Ranked Horizontal Bar Chart:
For When No Pie Chart Will Work
/* sections statements */
DATA=INDATA,
BARS=25,
BARWIDTH=1.5,
MIDPOINT=STATE NAME,
MIDPTLEN=39999,
RESPONSE=COUNT,
RESLUBL=Number Count,
RESPFCT=COMMA,
RHMKSH=21,
BMPLBLLEN=STRT,
TOTALBL=USA Total,
TITLE=State and Local ... in October 1991
RUN;

Exhibit 10A. Program for Exhibit 10

%MACRO HBARANNO(DATA= Input Data,
MIDPTLEN=39999,
MPLABEL=State Name,
MPLILLEN=STRTR,
TTLTEXT=STPTP,
RMINSHIF=ZI,
RESPFMT=CDWA9,
BARNIDTH=0.55,
BARPACE=0.55,
TITLE1=Exhibit 10B,
TITLE2=HBARANNO Macro,
TITLE3=HBARANNO Macro,
TITLE4=HBARANNO Macro,
TITLE5=HBARANNO Macro,
FOOTNOTE=\n*/
DATA=INDATA,
BARS=25,
BARWIDTH=1.5,
MIDPOINT=STATE NAME,
MIDPTLEN=39999,
RESPONSE=COUNT,
RESLUBL=Number Count,
RESPFCT=COMMA,
RHMKSH=21,
BMPLBLLEN=STRTR,
TOTALBL=USA Total,
TITLE=State and Local ... in October 1991
RUN;

Exhibit 10A. Program for Exhibit 10

%MACRO HBARANNO(DATA= Input Data,
MIDPTLEN=39999,
MPLABEL=State Name,
MPLILLEN=STRTR,
TTLTEXT=STPTP,
RMINSHIF=ZI,
RESPFMT=CDWA9,
BARNIDTH=0.55,
BARPACE=0.55,
TITLE1=Exhibit 10B,
TITLE2=HBARANNO Macro,
TITLE3=HBARANNO Macro,
TITLE4=HBARANNO Macro,
TITLE5=HBARANNO Macro,
FOOTNOTE=\n*/
1991 Per Capita Consumption of Beverages in Six Categories

Estimates from "Beverage World 1992-m Data Bank"

<table>
<thead>
<tr>
<th>Share</th>
<th>Gallons</th>
<th>Beverage Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>51.2%</td>
<td>48.4</td>
<td>Soft Drinks</td>
</tr>
<tr>
<td>24.5%</td>
<td>23.2</td>
<td>Beer</td>
</tr>
<tr>
<td>12.3%</td>
<td>11.6</td>
<td>Fruit Juices and Drinks</td>
</tr>
<tr>
<td>8.5%</td>
<td>8.0</td>
<td>Bottled Water</td>
</tr>
<tr>
<td>2.0%</td>
<td>1.9</td>
<td>Wine</td>
</tr>
<tr>
<td>1.5%</td>
<td>1.4</td>
<td>Spirits</td>
</tr>
</tbody>
</table>

Exhibit 11. New, Improved Pie Chart
Annual U. S. Beer Consumption
Gallons per Capita

24.6

22.5

23.3

Gallonage: John C. Maxwell, Jr., Wheat First Securities
Reported in: "Beverage Industry", February 1990

Exhibit 12. Sparse Annotation: End-points and Maximum Only

Production of Miller Lite
Millions of Barrels

Data Source: "Beverage Industry"

Exhibit 13. Sparse Annotation: End-points and Trend-Change Point Only