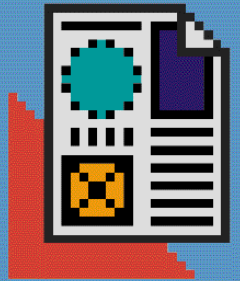


# A U T O P A G E



Automating page layout  
with QuarkXPress

# "Autopage delivers more finished pages

than the well known proprietary batch pagination system we have been using.

Autopage has changed the way we look at Quark jobs, which were very labor intensive. Not only can we paginate very complex books with large numbers of sidenotes, footnotes and illustrations, but it allows us to paginate chapters and parts of chapters. And since it outputs Quark pages, we can tweak it interactively, giving us tremendous flexibility. We found it easy to train people on Autopage and KyTek's technical support is awesome."

Bruce C. Nesbitt,

Director of Media Services

Ruttle, Shaw and Wetherill, Inc.



Autopage easily handles complex part and chapter opening pages set up with standard QuarkXPress master pages

Art and Table Placement	
<b>Vertical Placement:</b>	<b>Horizontal Placement:</b>
<input checked="" type="checkbox"/> Top	<input checked="" type="checkbox"/> Multi-column Before Ref. Lk
<input checked="" type="checkbox"/> Bottom	<input type="checkbox"/> Single Column Before Ref. Ck
<input type="checkbox"/> Top or Bottom - Not Both	<input checked="" type="checkbox"/> Inside Margin
<input type="checkbox"/> Upper outside, Lower inside	<input checked="" type="checkbox"/> Neither Margin
<input type="checkbox"/> Scrolled art to upper outside	<input type="checkbox"/> Art Touching Outside Margin
<input checked="" type="checkbox"/> Stacking of Art Ok	<input checked="" type="checkbox"/> Outside Margin
<input checked="" type="checkbox"/> Stacking of Art With Text Ok	
<input checked="" type="checkbox"/> Art on First Page Ok	
<input type="checkbox"/> Enable Lyname: Art	
<b>Allow Placement Above Reference If:</b>	<b>Space Between Art</b>
Reference within: <input type="text" value="5"/> Times of page top	Minimum: <input type="text" value="12 pt"/>
and Intervening Head Ok:	Optimum: <input type="text" value="24 pt"/>
<input checked="" type="checkbox"/> H1 <input checked="" type="checkbox"/> H2 <input checked="" type="checkbox"/> H3 <input checked="" type="checkbox"/> H4 <input checked="" type="checkbox"/> H5 <input checked="" type="checkbox"/> H6	Maximum: <input type="text" value="42 pt"/>
<b>Maximum Art per Page:</b> <input type="text" value="10000"/> Places	Spread Max: <input type="text" value="12 pt"/>
<b>Provide Warning Message If:</b>	<b>Space Around Art</b>
<input checked="" type="checkbox"/> Art Not on Spread with Reference	Minimum: <input type="text" value="12 pt"/>
Art Further From Reference Than: <input type="text" value="1"/> Pages	Optimum: <input type="text" value="24 pt"/>
	Maximum: <input type="text" value="54 pt"/>
	Spread Max: <input type="text" value="12 pt"/>
	<b>Space Around Locked Art</b>
	Minimum: <input type="text" value="12 pt"/>
	Optimum: <input type="text" value="24 pt"/>
	Maximum: <input type="text" value="54 pt"/>
	Spread Max: <input type="text" value="12 pt"/>
	Units: <input type="text" value="Points"/>

You'll get precise control of layout rules for art and table placement with Autopage

# Autopage: The advanced QuarkXTension for automated long document page layout

## Autopage works the way you work

You can identify page elements, paginate with Autopage, and then make changes, all in QuarkXPress. Or, produce finished QuarkXPress pages from a coded word processing file. Keep all your options open—Autopage produces native QuarkXPress pages that can be viewed, edited and printed without Autopage. It's compatible with other XTensions. And, you can create structured QuarkXPress documents—hundreds of pages long—and easily re-purpose them as HTML pages or PDF files.

## Powerful features

Autopage easily accommodates the complexities of commercial books, textbooks, journals, and directories with precise handling of varying page layouts, illustrations, tabular material, copious footnotes and side-notes; producing visually balanced page spreads while eliminating widows and orphans.

Page elements are evaluated by looking both forward and backward in a document making adjustments in both directions and reducing the need for manual rework. Vertical spacing rules allow tighter control over spacing flexibility within a spread than between spreads. These powerful rules provide visually balanced spreads while allowing for maximum flexibility to achieve good page breaks. With the ability to paginate an entire book consisting of multiple QuarkXPress files, a host of sophisticated page element controls, and precise vertical spacing control, Autopage provides functionality exceeding proprietary systems at a fraction of the cost.

## Time tested and field proven

Since its introduction in 1991, Autopage has been continuously upgraded and enhanced with improvements requested by users working on real projects with real deadlines. Users like Cambridge University Press, Prentice Hall, Addison-Wesley-Longman, Hearst, Henry Holt, Harcourt Brace, and American Journal of Epidemiology who produce encyclopedias, college text books, and directories.

## Bottom line productivity

Autopage means working efficiently. You'll get powerful, automated layout tools with no clumsy workarounds. Stay within your established workflow—completely integrated with QuarkXPress—and boost your productivity as much as 400%. Autopage means no compromises. You'll produce QuarkXPress pages that can be edited or re-paginated at any time. You'll simplify your production process and save money. It's all possible with Autopage.

408 CHAPTER 6 EXPONENTS AND POLYNOMIALS

TABLE 6.1 summarizes the vocabulary associated with polynomials.

Polynomial	Terms of the Polynomial	Degree of Each Term	Degree of the Polynomial	Other Labels
$2x^3 + 5x^2 - 3x + 7$	$2x^3$ $5x^2$ $-3x$ $7$	3 2 1 0	3	Monomial Binomial Trinomial
$4x^5 - 7x^4$	$4x^5$ $-7x^4$	5 4	5	Binomial
$9x^6 - 4x^5 + 3$	$9x^6$ $-4x^5$ $3$	6 5 0	6	Trinomial
$6x^4 - 3x^3 + 2x - 5$	$6x^4$ $-3x^3$ $2x$ $-5$	4 3 1 0	4	No special name

**3** Write a polynomial in standard form.

**EXAMPLE 3** Writing a Polynomial in Standard Form

Write in standard form:

$$7x^2 - 9x^6 + 5x^4 + 3$$

**Solution**

$$-9x^6 + 5x^4 + 7x^2 + 3$$

In descending powers, the terms are written from the highest degree to the lowest degree from left to right. The degree of the polynomial is 6.

**4** Add and subtract polynomials.

**Adding and Subtracting Polynomials**

As we know from our work in Chapter 1, we cannot combine terms in the polynomial  $3x^2 + 7x - 5 + 19x^3$ . The terms containing exactly the same variables to the same powers may be combined. For example,  $2x^2$  and  $-10x^2$  are like terms because each has a second-degree  $x$ . These like terms can be combined by adding the coefficients of the terms ( $2 - 10 = -8$ ) and keeping the same variable factor:

$$2x^2 - 10x^2 = -8x^2$$

The following examples rely on combining like terms.

**EXAMPLE 3** Adding Polynomials Horizontally

Add  $-9x^3 + 7x^2 - 5x + 3$  and  $13x^3 + 2x^2 - 8x - 6$ .

**Solution**

The like terms are  $-9x^3$  and  $13x^3$  (containing the same variable to the same power  $x^3$ ),  $7x^2$  and  $2x^2$  (both contain  $x^2$ ),  $-5x$  and  $-8x$  (both contain  $x$ ) and the constant terms 3 and  $-6$ . We begin by grouping these pairs of like terms:

$$(-9x^3 + 13x^3) + (7x^2 + 2x^2) + (-5x - 8x) + (3 - 6)$$

Use the commutative and associative properties to rearrange terms, grouping like terms. Combine like terms by adding coefficients and keeping the same variable factor.

$$= 4x^3 + 9x^2 - 13x - 3$$

**EXAMPLE 4** Adding Polynomials Vertically

Add  $-9x^3 + 7x^2 - 5x + 3$  and  $13x^3 + 2x^2 - 8x - 6$ .

**Solution**

$$\begin{array}{r} -9x^3 + 7x^2 - 5x + 3 \\ + 13x^3 + 2x^2 - 8x - 6 \\ \hline 4x^3 + 9x^2 - 13x - 3 \end{array}$$

We add the four sums together:

$$4x^3 + 9x^2 + (-13x) + (-3) = 4x^3 + 9x^2 - 13x - 3$$

This is the same answer found in Example 3.

In Chapter 1, subtraction of real numbers was defined by  $a - b = a + (-b)$ .

For example,

$$8 - 3 = 8 + (-1) = 5 \quad \text{and} \quad -9 - (-4) = -9 + (4) = -5.$$

We follow a similar method for the subtraction of polynomials.

To subtract two polynomials, change the sign of every term of the second polynomial. Add this result to the first polynomial.

**EXAMPLE 5** Subtracting Polynomials

Subtract:  $(7x^2 + 3x - 4) - (4x^2 - 6x - 7)$

**Solution**

$$(7x^2 + 3x - 4) - (4x^2 - 6x - 7)$$

$$= (7x^2 + 3x - 4) + (-4x^2 + 6x + 7)$$

Change the sign of each term of the second polynomial and add.



# Autopage Features



for "enabling high-quality batch pagination with QuarkXPress"



Autopage 5's floating palette provides easy access to most functions of the XTension.

Autopage easily handles a variety of layout variations on a single page as seen on the right page of this spread. The layout changes from 1 column to 3 column to 1 column to 2 column to 1 column to 2 column. The breaking and balancing of the columns and spacing adjustments between the rows are automatically handled to balance the facing

## Text

- Control orphans and widows
- Group lines and paragraphs that must stay together
- Control spacing variation above heads and around paragraphs
- Vary paragraph depths during pagination with word space kerning and/or paragraph tracking to gain/lose lines to improve page breaks
- Automatic creation and placement of text elements with frames and/or tinted backgrounds

## Art and Tables

- Automatic art and table placement in proximity to reference at page top, page bottom or inline
- Control bleeds off top, left, right, and/or bottom of page
- Handle art that spans spreads
- Horizontal caption placement based on whether art placed on left or right page
- Vertical caption placement based on whether art placed at top or bottom of page
- Independent control of art alignment and caption placement for each art element

## Chapter Opening Pages

- Use standard QuarkXPress templates to set up your documents
- Use standard QuarkXPress master pages to set up special chapter opening pages

## Tagging

- Easy point and click interface for tagging art, tables, side art, footnotes, and margin notes
- Or, automated tagging through codes placed in word processing files
- Coding can be used to create complex multi-column layout variations
- Coding can be used to create text boxes with tinted backgrounds and colored frames of any style

## Footnotes

- Footnote marking with numbers, symbols or letters
- Option to place rule above footnotes with control over thickness, length, color, shade, alignment and spacing
- Split footnotes across columns with independent control of the rule placed above split footnotes
- Option to prevent art and footnotes falling together at the bottom of a column
- Combine multiple short footnotes on a single line or place all notes in the rightmost column
- Page width footnotes in multi-column layout
- Multi-column footnotes in single column layout
- Multiple references to the same note where the note is placed only once on a page with one or more references to it (optional)

## Margin Notes and Margin Art

- Margin elements useful for hanging heads, icons, definitions, and graphic overlays
- Variety of controls for the horizontal and vertical alignment of margin elements with respect to their reference
- Sidenotes in multi-column layouts
- Support for four levels of margin notes and art with independent horizontal placement controls
- Option to float side elements to the top or bottom of the margin column
- Placement of tints behind words

## Page Layout

- Balance page depths across spreads
- Control page depth variation between spreads
- Control how excess vertical space is allocated in a column
- Automatically balance columns on the last page
- Constrain spacing variation more tightly on a spread than between spreads
- Maintain page breaks of previously paged jobs while adjusting vertical spacing to handle editorial changes

## Top of Page Alignment

- Choice of baseline or optical alignment at page tops
- Option to sink heads at top of column to align body text below on the grid

## Job Control

- Control the number of pages simultaneously considered when making page break decisions
- Paginate any part of a job
- Run the entire process in the background
- Limit the amount of time spent on any job
- One step book pagination – prepare a QuarkXPress template and tagged text files and Autopage builds the book
- One step re-pagination of complete books after editing QuarkXPress pages

## Yellow Pages/Directories

- Placement of category continued lines at top of column, page or spread
- Placement of category continued lines at bottom of turn page
- Filler placement
- Rotation of filler elements of same size
- Mandatory filler placement
- Single use filler placement
- Option to place display ads so they touch their category listings
- Option to sort display ads by size for placement
- Option to prevent display ads from touching the spread gutter

## Page Layout Rules:

- All page layout rules are in a single file for easy re-use or modification
- Different layout rules can be used at different points in the same job

## HTML – World Wide Web Pages:

- Automated generation of HTML pages for the World Wide Web from the structured QuarkXPress documents created by Autopage

## Error Handling:

- When pages can't be made up according to your rules you can specify what type of errors you prefer: short pages vs. orphans/widows, short pages vs lines split from heads, slightly long pages vs very short pages. These options enhance your ability to work interactively with the finished pages to create the layout you want.
- This feature not part of the Autopage Personal Edition.

For more information about Autopage 5.1 call KyTek at 603-529-2512 www.kytek.com

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KyTek, Inc., PO Box 338, Weare, N.H. 03281, USA

### INSIGHT Physiological Diffusion

Diffusion plays a central role in many life processes. For example, consider cell membrane in the lung. Such a membrane is permeable to a number of substances, any of which will diffuse through the membrane from regions where its concentration is high to regions where it is low. Most importantly, the lung membrane is permeable to oxygen ( $O_2$ ) and carbon dioxide ( $CO_2$ ), the two gases that are exchanged in the breathing process. As a result of this concentration difference, oxygen  $O_2$  diffuses from the lung volume into the blood as it flows through the lung tissue, and the blood carries the high  $O_2$  concentration to the tissues.

Exchanges between the blood and the tissues occur across capillary walls and diffuse through a single cell. The thinness of the capillary wall and the large surface area of the capillary bed in the lung ensure that the rate of diffusion is high. The rate of diffusion depends on the average speed of the molecules ( $\bar{v}$ ), which in turn depends on the temperature and the mass of the gas molecule. Let's now take a look at the rate of diffusion.

where  $A_1$  and  $A_2$  are the diffusion areas (m<sup>2</sup>/m) of two gases and the  $v_{avg}$  are the average rms speeds of the molecules. Then, by Eq. 10.34 for constant temperatures (and pressures),

$$\frac{A_1 \bar{v}_1}{A_2 \bar{v}_2} = \frac{A_1 \sqrt{\frac{3k_B T}{m_1}}}{A_2 \sqrt{\frac{3k_B T}{m_2}}} = \frac{A_1 \sqrt{m_2}}{A_2 \sqrt{m_1}} \quad (10.36)$$

Thus, the rate of gas diffusion of gas molecules is inversely proportional to the square root of the molecular mass. This result is known as Graham's law and was experimentally demonstrated by Thomas Graham (1805–1855), a Scottish chemist.

**EXAMPLE 10.10** **GRAHAM'S LAW**  
Which gas will diffuse through a porous membrane faster: oxygen ( $O_2$ ) or nitrogen ( $N_2$ )? The molecular masses of  $O_2$  and  $N_2$  are about  $4.0 \times 10^{-26}$  kg and  $4.7 \times 10^{-26}$  kg, respectively.

**Solution:**  $m_1 = 4.0 \times 10^{-26}$  kg.  $\bar{v}_{O_2}$  will diffuse faster.

$m_1 = 3.3 \times 10^{-26}$  kg, and have many times faster.

By Graham's law, the lighter molecules are transported to the molecular mass, and since nitrogen has the smaller molecular mass, it will have the greater diffusion rate and diffuse faster.

The ratio of the diffusion rates is given by Eq. 10.36, and

$$\frac{A_1 \bar{v}_1}{A_2 \bar{v}_2} = \frac{A_1 \sqrt{m_2}}{A_2 \sqrt{m_1}} = \frac{A_1 \sqrt{4.7 \times 10^{-26} \text{ kg}}}{A_2 \sqrt{4.0 \times 10^{-26} \text{ kg}}} = \sqrt{1.17} = 1.07$$

Then nitrogen diffuses about 7 percent faster than oxygen.  $R_{N_2} = 1.07 R_{O_2}$ .

**Follow-up Exercise:** At what temperature would oxygen diffuse as fast as nitrogen does at room temperature?

Diffusion is very important to organisms. In plant photosynthesis, carbon dioxide ( $CO_2$ ) from the air diffuses into the leaves, and oxygen and water vapor diffuse out. The diffusion of liquid water across a permeable membrane because of a concentration gradient is called osmosis. It is vital to living cells. Osmotic pressure is also important to living cells. It is the force that tends to move water from a region of low solute concentration to a region of high solute concentration. (See the Insight on p. 346 for other examples of diffusion.)

### Chapter Review

<b>Important Terms</b>	<b>Mean free path</b> gas law 332	<b>thermal coefficient of area expansion</b> 338
<b>hard</b> 327	<b>absolute zero</b> 324	<b>thermal coefficient of volume expansion</b> 338
<b>internal energy</b> 327	<b>Kelvin temperature scale</b> 324	<b>thermal coefficient of volume expansion</b> 338
<b>fluorometer</b> 328	<b>kelvin</b> 324	<b>kinetic theory of gases</b> 342
<b>thermal expansion</b> 329	<b>triple point of water</b> 324	<b>diffusion</b> 342
<b>thermal temperature scale</b> 329	<b>Abrams' number</b> 325	<b>Graham's law</b> 346
<b>Celsius temperature scale</b> 329	<b>mole</b> 325	<b>osmosis</b> 347
<b>Rayleigh's law</b> 332	<b>thermal coefficient of linear expansion</b> 337	

**Important Concepts**

- Heat is energy transferred from one object to another because of temperature difference. Once transferred, the energy becomes part of the internal energy of the object (or system).
- The ideal gas law relates pressure, volume, and absolute temperature.
- Absolute zero (0 K) corresponds to  $-273.15^\circ\text{C}$ .
- Thermal coefficients of expansion relate the fractional change in dimension to a change in temperature.
- According to kinetic theory, the absolute temperature has a direct relationship to the average random kinetic energy per molecule.
- Graham's law relates the rate of process diffusion to the square root of the molecular mass of a gas.

**Important Equations**

**Celsius–Kelvin Conversion:**

$$T_C = T_K - 273.15 \quad (10.1)$$
$$T_K = T_C + 273.15 \quad (10.2)$$

**Boyle's law:**

$$pV = \text{constant} \quad \text{or} \quad p_1 V_1 = p_2 V_2 \quad (10.3)$$

**Charles's Law:**

$$\frac{V}{T} = \text{constant} \quad \text{or} \quad \frac{V_1}{T_1} = \frac{V_2}{T_2} \quad (10.4)$$

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# Complete controls for text books

"It's to the point where regardless of complexity or length, my composition staff wouldn't waste their time producing a book WITHOUT Autopage and Xtags. Once they crest the learning curve they've refined a structured and logical process that is inherently more efficient. Composing books without Autopage in QuarkXPress is like handsetting metal type line by line... With Autopage and Xtags we program the content. In the first 3 or 4 chapters we debug the code and from that point on the time saved is at least 70% of straight QuarkXPress."

**David Riccardi**  
 Director/Assistant Vice President  
 Production and Manufacturing  
 Prentice Hall Higher Education  
 Engineering, Science, Math and  
 Computer Science

Autopage is the only XTension used by publishers around the world to replace expensive proprietary pagination systems. Complete, sophisticated controls for text book publishing produce balanced pages and increase productivity.

## Sophisticated controls for book publishing:

- Adjust spacing around heads, equations, extracts, art and footnotes to balance facing page spreads
- Easily accommodate straddle heads and other layout variations
- Eliminate orphans and widows
- Group lines that must not split between pages
- Place floating art and tables referenced in the text including art and tables that span a spread
- Page placement dependent caption alignment—inside/outside and top/bottom
- Place inline art and tables
- Place minor column art, tables and notes
- Handle art and margin art bleeds off top, bottom, left and right
- Create and place inline text boxes that are tinted and/or framed with or without page breaking allowed
- Place tints behind individual words in the text
- Page placement dependent alignment of heads, margin notes and captions
- Option to prevent footnotes and art together at bottom of page

Autopage creates and paginates text with tinted backgrounds. The brown tinted text on this spread is allowed to break between pages though you can prevent this if desired. Autopage can also apply tints behind words such as the yellow tints on this spread.

Autopage places floating art (top of left page), margin notes (left of left page) and margin art (right of right page) in proximity to references in the body text. Autopage aligned the text of the caption associated with the art at the top of the left page to the inside of the page (right aligned as the art is on the left page). Autopage placed the entire caption to the outside of the page (the left side as it's on a left page).

**FIGURE 10.3 Fahrenheit versus Celsius**

(a) A plot of Fahrenheit temperature versus Celsius temperature gives a straight line of the general form  $y = mx + b$ , where  $T_F = T_C + 32$ . (b) The temperature is given here in degrees Celsius. What is the equivalent temperature in degrees Fahrenheit?

The two familiar temperature scales are the **Fahrenheit temperature scale** and the **Celsius temperature scale**. As shown in Fig. 10.3, the ice and steam points have values of 32°F and 212°F, respectively, on the Fahrenheit scale and 0°C and 100°C on the Celsius scale. On the Fahrenheit scale, there are 180 equal intervals, or degrees (°F), between the two reference points, and on the Celsius scale, there are 100 (°C). Therefore, a Celsius degree is larger than a Fahrenheit degree: since  $180/100 = 9/5 = 1.8$ , it is almost twice as large.

A relationship for converting between the two scales may be obtained from a graph of Fahrenheit temperature ( $T_F$ ) versus Celsius temperature ( $T_C$ ) like the one in Fig. 10.3. The equation of the straight line (in general slope-intercept form,  $y = mx + b$ ) is

$$T_F = \left(\frac{180}{100}\right)T_C + 32$$

and

$$T_F = 1.8T_C + 32$$

or

$$T_F = 1.8T_C + 32 \quad \text{Celsius to Fahrenheit conversion (10.1)}$$

where 1 or 1.8 is the slope of the line and 32 is the intercept on the vertical axis. Thus, to change from a Celsius temperature ( $T_C$ ) to its equivalent Fahrenheit temperature ( $T_F$ ), you simply multiply the Celsius reading by 1.8 and add 32. The equation may be solved for  $T_C$  to convert from Fahrenheit to Celsius:

$$T_C = \frac{1}{1.8}(T_F - 32) \quad \text{Fahrenheit to Celsius conversion (10.2)}$$

**EXAMPLE 10.1 | CONVERTING TEMPERATURE SCALE READINGS: FAHRENHEIT AND CELSIUS**

What are (a) 20°C on the Fahrenheit scale, and (b) normal body temperature, 98.6°F, on the Celsius scale?

**Solution.** We wish to make the following conversions:

**Given:** (a)  $T_C = 20^\circ\text{C}$  (b)  $T_F = 98.6^\circ\text{F}$

**Find:** (a)  $T_F$  (b)  $T_C$

(a) Eq. 10.1 is for changing Celsius readings to Fahrenheit:

$$T_F = 1.8T_C + 32 = 1.8(20) + 32 = 68^\circ\text{F}$$

This temperature, often taken to be room temperature, is a good one to remember.

(b) Eq. 10.2 changes Fahrenheit to Celsius:

$$T_C = \frac{1}{1.8}(T_F - 32) = \frac{1}{1.8}(98.6 - 32) = \frac{66.6}{1.8} = 37.0^\circ\text{C}$$

On the Celsius scale, normal body temperature has a whole-number value. Keep in mind that a Celsius degree is 1.8 times (almost twice) as large as a Fahrenheit degree, so a temperature variation of several degrees on the Celsius scale makes a big difference. For example, a temperature of 40°C represents an absolute of 216°C over normal body temperature. This is an increase of  $2.0 \times 1.8 = 3.6^\circ$  on the Fahrenheit scale, or a temperature of  $104 = 36.7^\circ\text{F}$ .

**Follow-up Exercise.** Convert the following temperatures: (a)  $-40^\circ\text{F}$  to Celsius, and (b)  $-40^\circ\text{C}$  to Fahrenheit.

**PROBLEMSOLVING HINT**

Because of the similarity between Eqs. 10.1 and 10.2, it is easy to mix them. Since they are equivalent, you need to know only one of the equations; say Celsius to Fahrenheit [Eq. 10.1,  $T_F = 1.8T_C + 32$ ]. Solving this for  $T_C$  algebraically gives Eq. 10.2. A good way to make sure that you have written the conversion equation correctly is to test it with a known temperature, such as the boiling point of water. For example,  $T_C = 100^\circ$  and  $T_F = 212^\circ$ .

$$T_F = 1.8T_C + 32 = 1.8(100) + 32 = 212^\circ\text{F}$$

Thus we know the equation is correct.

Liquid-in-glass thermometers are adequate for many temperature measurements, but problems arise when very accurate determinations are needed. A material may not expand uniformly over a wide temperature range. When calibrated to the ice and steam points, an alcohol thermometer and a mercury thermometer have the same readings at these points. But because of different expansion properties, the thermometers will not have exactly the same readings at intermediate temperatures, such as room temperature. For very sensitive temperature measurements and to define intermediate temperatures precisely, some other type of thermometer must be used. One such thermometer is discussed in the next section.

**10.3 Gas Laws and Absolute Temperature**

**Objectives:** To be able to (a) describe the ideal gas law, and (b) explain how it is used to determine absolute zero.

Different liquid-in-glass thermometers show slightly different readings for temperatures other than the fixed points because of differing expansion properties. A thermometer that uses a gas, however, gives the same readings regardless of which gas is used. Experiments show that all gases at very low densities exhibit the same expansion behavior.

The variables that describe the behavior of a given quantity (mass) of gas are pressure, volume, and temperature  $p$ ,  $V$ , and  $T$ . When temperature is held constant, the pressure and volume of a quantity of gas are related as follows:

$$pV = \text{constant} \quad \text{or} \quad p_1V_1 = p_2V_2 \quad (\text{at constant temperature}) \quad (10.3)$$

330 CHAPTER 10 Temperature

10.3 Gas Laws and Absolute Temperature 331

# Powerful automation for legal books

“After years of investigation and evaluation it was the combination of QuarkXPress and Autopage that allowed us to make the step forward to the Macintosh. Previously we used a proprietary typesetting system to produce all our legal work with many footnotes on every page. We are very pleased by the speed and quality we are achieving with the Autopage engine. It is a lot faster, more transparent and of course it has the real advantage of producing QuarkXPress documents that are easily manipulated by anybody else.”

Bruno Hayoz  
Paulusdruckerei  
Switzerland

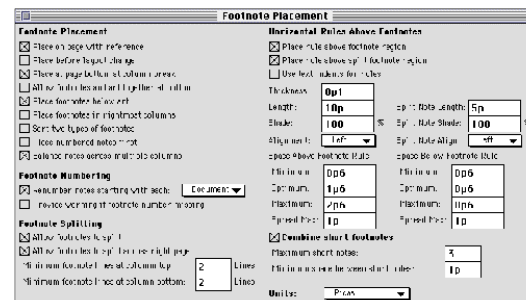
“Autopage enables us to keep up with our tremendous fluctuations in volume. We’re now able to do very complicated books, some with triple digit footnotes, in 75% less time than using QuarkXPress alone. And no other software vendor supports their products the way KyTek does.”

Keith Sipe  
President  
Carolina Academic Press

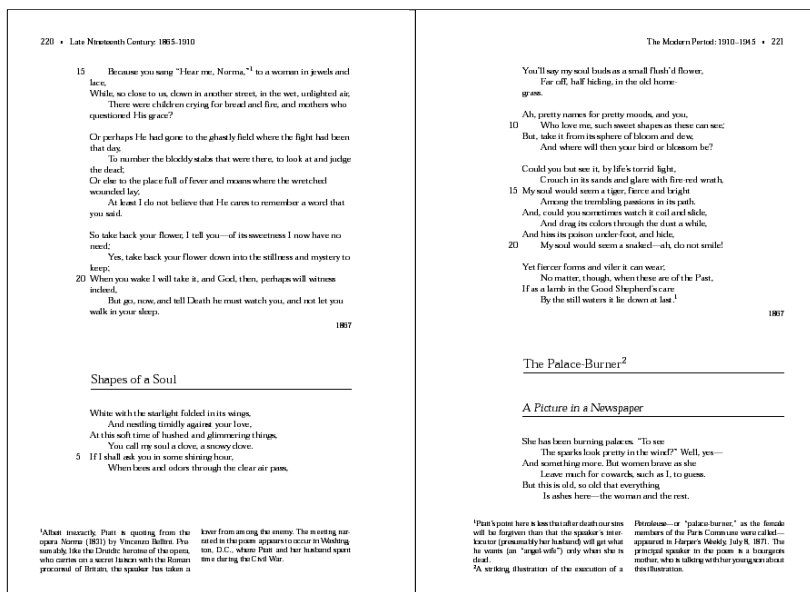
This spread shows an example of multi-column footnotes placed under single column body text. The footnote columns are automatically balanced at the bottom of the page.

## Productivity for legal book publishers:

- Place and number footnotes
- Place footnote rule with control over its length, thickness, alignment, color, and shade
- Control the footnote rule placed above a split footnote independently from that placed above a note that isn't split from a prior column
- Combine short footnotes on a single line
- Place multi-column notes below single column body text
- Place single column notes below multi-column body text
- Lettered and numbered notes sorted at page bottom
- Option to place all notes in rightmost column of page
- Split notes between columns/pages



The Footnote Placement dialog lets you indicate how footnotes are placed and numbered, whether footnotes can split between pages, what vertical spacing variation is allowed between them and the body text and what footnote rules are placed



# Efficient production of reference books, trade books, and directories

“Autopage is a very efficient way to produce books in QuarkXPress. We can paginate complex books in half the time we could without Autopage. On simpler books, without illustrations, we find that we are paginating in 75% to 80% less time than we used in QuarkXPress without Autopage.”

Terry Leaden  
Systems Manager  
Professional & Reference Division  
McGraw Hill, Inc.  
Satisfied Autopage user since 1991

## Autopage features for trade books:

- Variation between spread depths to eliminate orphans and widows
- Word space kerning and/or paragraph tracking to vary paragraph depths during pagination to eliminate orphans and widows
- Word space kerning and paragraph tracking prior to page layout to eliminate paragraphs with short last lines

Short Line Elimination

A short last paragraph line consists of:

Fewer characters than:  or a hyphenated last word:  Yes  No

To eliminate a short last line:

Allow word space kerning:	Allow letter space tracking:
Default Kerning: <input type="text" value="0"/>	Default Tracking: <input type="text" value="0"/>
Minimum to Tighten: <input type="text" value="6"/>	Minimum to Tighten: <input type="text" value="3"/>
Maximum to Loosen: <input type="text" value="6"/>	Maximum to Loosen: <input type="text" value="5"/>
Step Kerning By: <input type="text" value="5"/>	Step Tracking By: <input type="text" value="25"/>

Tracking/Kerning Preference:  Tight  Tight Tie  Loose Tie  Loose

Autopage provides controls allowing you to word space kern and/or track paragraphs in units as fine as 1/200,000 of an em. This feature is used statically to eliminate paragraphs with short last lines or dynamically to eliminate orphans and widows during pagination.

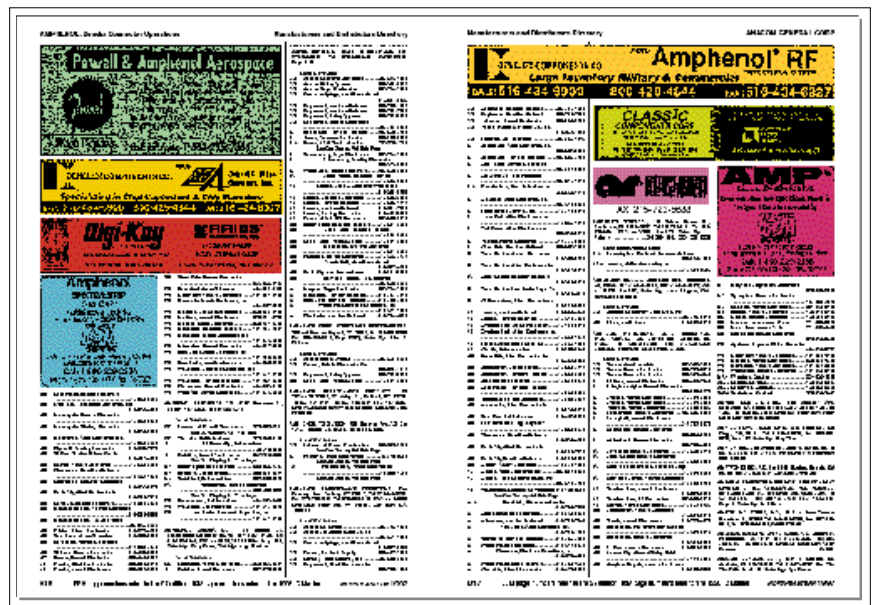
“We publish nine directories that are similar to yellow pages for the electronics market. We produced these in QuarkXPress our first year. When we added Autopage to our operation in the second year, we reduced the composition time for each volume from 40 hours to 5 hours.”

Bill Baker  
Vice President & General Manager  
Hearst Business Publishing

## Autopage makes the difference for directories:

- Display ads automatically sorted by width and height for placement independent of the order of their callouts in the listings
- Boxed listings automatically created and placed with or without splitting between columns

Autopage automatically sorts display ads by width and height for placement independent of the order the ads are called out in the listings.





# Professional yellow page layout

“Our production used to go through a long chain of hands, the material being sent back and fourth, between the inhouse staff, the compositor and the printer. In 1996, Autopage made it possible to bring production inhouse and we can now do all the preparation here and send Postscript files directly to the printer. With fewer people involved, I can better survey the production and am more in control of the material. Corrections are easily and speedily made and the information printed is consequently much more up-to-date now than before.

We have just recently completed the 1997 edition of StorTele and this year the production was a breeze! Autopage has proved to be a jewel. It is such an advanced program and yet so user-friendly. I am amazed that a program that is so easy to use can offer such a multiplicity of features.”

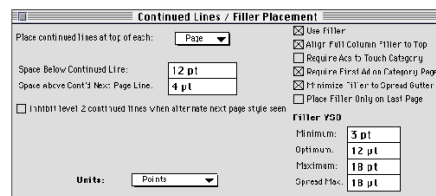
Eva Karlsson  
 Bonnier Telenor Företagsinfo AB  
 Sweden

Autopage 5.1 gives you complete control to easily produce yellow page listings. Automatically place category continued lines at the top of columns, pages or spreads. Add filler elements. Place display ads with category listings. With these and many other automation features, you'll gain the capabilities to produce any kind of phone book, directory, or listing.

The users? Major publishers like TALX; Bonnier Telenor Företagsinfo, Sweden; and Media Nova Communications, Norway use Autopage for yellow page production.

## Among the features for creation of Yellow Pages:

- Place category continued lines at top of column page or spread
- Place display ads and inline ads
- Place filler including rotation, mandatory filler and single use filler with filler placement minimized and optimized to spread gutter
- Option to place display ads so they touch their category



The Continued Lines / Filler Placement dialog lets you control whether continued lines are placed at the top of each column, page or spread; what special rules are used to place display ads near their category and how filler placement is handled.

This spread shows a variety of Autopage features for producing yellow pages. All the ads on this spread are referenced in the same category and are placed so the first ad touches that category.

The multi-line continued line at the top of the column on the left page is automatically placed by Autopage as is the category continued line at the bottom of the right page.

The filler at the bottom of the column on the left page is also automatically placed. Autopage supports filler rotation, single use filler and mandatory placement filler. You can also group filler of varying sizes so placement of any one of the sizes constitutes placement of that filler for purposes of calculating the rotation.