The Return of the Bell Double-Crostic

by John P. Robertson

Allan Bell has produced another fine double-crostic for *The Actuarial Review.* On this page, the first column of the solutions to the clues gives the name of the author and the title of the work.

A. CAS President and actuarial philosopher who wrote the classic paper "Experience Rating Plan Credibilities" ....
122 30 150 101 6 51 89 188

B. City famed for the Temple of Artemis, one of the Seven Wonders of the Ancient World ....
178 61 153 19 131 93 47

C. Grooved, furrowed ....
90 75 121 148 104 53

D. Chief Actuary of the Social Security Administration (1975-1978) and author of *The Coming Revolution in Social Security* ....
172 109 70 128 44 21 151 87 5

E. 1923 Nobel Prize recipient who devoted his career to the development of Irish national literature ....
141 52 28 72 107

F. Accounting term for premium, receipts, and investment income less payments for underwriting expenses, loss adjustment expenses, and losses (two words) ....
157 137 7 59 112 27 173 81

G. Cassowaries, emus, kiwis, and ostriches ....
23 45 177 130 66 91 152

H. Only survivor of the *Pequod* ....
82 179 36 3 147 60 123

I. The product of x, y, and z, given x=y+z+l, 3y=x+z+l, and 4z=x+y+l ....
43 63 187 103 26 2 138 161 120 84

J. Villain who manipulates Desdemona's husband into murdering her ....
106 169 144 22

K. Perennial composite herb with hoof-shaped leaves used at one time in cough medicine ....
125 57 146 33 185 168 100 17 78

L. One of two or more forms of an element that has the same atomic number but a different atomic weight ....
1 38 149 96 62 181 126

M. Fire and casualty company that has the second largest premium volume among stock insurers (two words) ....
184 58 164 13 80 99 37 142 116

N. "The __________ and Destiny of the CAS," 1991 Presidential Address of Charles Bryan ....
86 124 29 145 182 9 102 163 67 46

O. Side of a coin that bears the main design ....
97 140 170 40 118 12 64

P. Class of property for which theft losses are limited to $2,000 under standard homeowners forms ....
88 54 127 183 160 20 110 35

Q. Pitcher who earned 234 of his 286 wins while playing for Philadelphia (ME.) ....
98 133 162 41 175 8 71

R. River (or strait) whose features include Flushing Bay, Hell Gate, and Roosevelt Island ....
34 117 165 56

S. Broadway role played by Julie Andrews opposite Richard Burton and Robert Goulet ....
92 180 115 55 11 129 77 31 159

T. "______________ Loss Development Factors," 1994 Woodward-Fondiller Prize paper by Daniel M. Murphy ....
69 134 39 186 156 83 15 108

U. Adjective describing the point of the nadir on the celestial sphere ....
158 49 105 24 135 76

V. A procedure for solving a mathematical problem in a finite number of steps that frequently involves repetition of an operation ....
176 94 25 154 50 73 10 114 136

W. The amount of vertical displacement produced by a geological fault; a light coverlet ....
113 79 65 171 155

X. Eighth century B.C. Hebrew prophet whose theology emphases Yahweh's kingship and His holiness ....
166 68 95 132 32 14

Y. Period when charges are less expensive because usage is lower ....
85 48 174 16 143 4 119

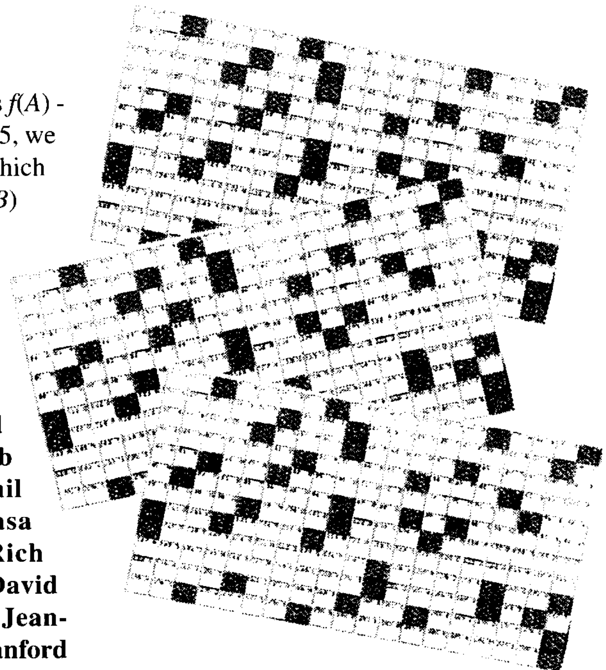
Z. English mathematician (1642-1727) who discovered integral calculus
167 139 18 74 111 42

Once solved, the diagram below will contain a quotation relevant to the insurance business. The quotation is used with permission (we'll divulge whose permission in the next issue).

Four Degrees of Matthew Rodermund

The puzzle was to find a fourth degree polynomial, $f(x) = ax^4 + bx^3 + cx^2 + dx + e$, with integer coefficients, so that $f(25) = 13$ and $f(1974) = 1999$, or show that no such polynomial exists. **Tom Struppeck's** solution is essentially as follows. Suppose there were such a polynomial. For any two values of x, say A and B, we can write $f(A) - f(B) = a(A^4 - B^4) + b(A^3 - B^3) + c(A^2 - B^2) + d(A - B)$. The factor $A - B$ divides each of $A^4 - B^4$, $A^3 - B^3$, $A^2 - B^2$, and $A - B$, so $A - B$ evenly divides $f(A) - f(B)$. Taking $A = 1974$ and $B = 25$, we have $A - B = 1974 - 25 = 1949$, which does not evenly divide $f(A) - f(B) = 1999 - 13 = 1986$. So there can be no such polynomial. This proof clearly can be extended to polynomials of any degree.

Solutions were also sent in by Nilgun Akgul, **David Atkinson**, **Walter Fransen**, **Bob Hallstrom**, Eric Halpern, **Phil Heckman**, Mike Hobart, **Rasa McKean**, Claude Nadeau, **Rich Newell**, **Randy Nordquist**, **David Oakden**, Stephen Riihimaki, **Jean-Denis Roy**, Matthew Schutz, **Sanford R. Squires**, and David Uhland.■



1 L	2 I		3 H	4 Y	5 D	6 A		7 F	8 Q	9 N	10 V	11 S	12 O		13 M	14 X	15 T	
16 Y	17 K	18 Z	19 B	20 P		21 D	22 J		23 G	24 U	25 V	26 I	27 F	28 E	29 N	30 A		31 S
32 X	33 K	34 R	35 P		36 H	37 M	38 L		39 T	40 O	41 Q	42 Z		43 I	44 D	45 G	46 N	47 B
48 Y	49 U	50 V	51 A	52 E	53 C		54 P	55 S	56 R	57 K		58 M	59 F	60 H		61 B	62 L	63 I
64 O	65 W		66 G	67 N		68 X	69 T	70 D	71 Q	72 E	73 V	74 Z	75 C	76 U	77 S		78 K	79 W
80 M		81 F	82 H	83 T	84 I	85 Y	86 N		87 D	88 P		89 A		90 C	91 G	92 S	93 B	94 V
95 X	96 L	97 O	98 Q		99 M	100 K	101 A		102 N	103 I	104 C		105 U	106 J	107 E	108 T	109 D	110 P
	111 Z	112 F		113 W	114 V	115 S		116 M	117 R	118 O	119 Y	120 I	121 C	122 A	123 H	124 N	125 K	126 L
	127 P	128 D	129 S	130 G	131 B	132 X	133 Q	134 T	135 U		136 V	137 F	138 I	139 Z		140 O	141 E	
142 M	143 Y	144 J	145 N	146 K	147 H	148 C	149 L	150 A	151 D		152 G	153 B	154 V	155 W		156 T		157 F
158 U	159 S	160 P	161 I		162 Q	163 N	164 M	165 R		166 X	167 Z		168 K	169 J	170 O	171 W	172 D	
173 F	174 Y		175 Q	176 V	177 G	178 B		179 H	180 S	181 L	182 N	183 P	184 M	185 K	186 T	187 I	188 A	