This is "George"

LET GEORGE DO IT

The Story of the A.D.S. Data Bank

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It's mighty hot in Hot Springs, Arkansas, during mid-October. I refer not only to the thermometer, which stood in the 90's each day, but also to the civic atmosphere. The dice at the crap tables were "hot." The coolest things in the late cabaret shows were the lightly clad ladies. The ponies weren't running at the track, but the hot springs were running faithfully in the various bath houses. As a matter of fact, the corridors of our hotel almost always looked like a surprise "fire drill" as they filled and emptied with scurrying figures clad in bathrobes and carrying towels. It was here in the autumn of 1963 the members of your official board gathered to consider the interim business of the American Daffodil Society.

The afternoon meeting followed a luncheon so delicious that I could do little but snooze. This relaxed attitude on my part was aided by the business of the meeting which concerned "miniatures." These little bitty-bodies became lost among my rows of daffodils which I grow like so much corn. The miniature forms really need a rock garden. Here on the prairies where we've been busily hauling rocks away for generations, to turn about and haul them back would cast some slight doubt on our sanity. Rock gardens are lovely but are more-or-less uncommon in these parts.

The faithful who have declared themselves for the "miniatures" are staunch folk; they adhere only to the true gospel: "miniatures aren't just little." As the true-believers mended their fences here and there, my own thoughts idly turned to a problem of more personal interest. At the Iowa Methodist Hospital, in Des Moines, Iowa, some of us are engaged in a program which applies electronic data processing to clinical medicine and surgery. In other words, how valuable is an electronic digital computer as a medical consultant? The possible advantages of a digital computer are:

(1) The computer can store a large memory.

(2) The computer never forgets.

(3) The computer can calculate rapidly.

(4) The computer is not biased by recent experience or personal feeling.

(5) The computer has almost instantaneous and "total recall," i.e., it calls up **all** the pertinent facts.

The application of such data storage and processing to a patient with a pain in his tummy was interrupted by the statement: " . . . and we should possibly institute a file or collection of known daffodil parentages."

I don't know who made this statement because the fog only lifted as I heard the last few words. But then and there the Daffodil Data Bank of the A.D.S. was conceived. The obvious way to store daffodil information, allowing accuracy and ready access, is in an electronic computer.

I leaned over and mumbled to Bill Pannill " A perfect job for a computer." Bill whispered back, "Let's go!" You see, Bill Pannill uses a computer for data processing in his business. He instantly saw the advantages of such a collection of data. Between the two of us, we persuaded your Board of Directors to approve a study in daffodil data processing (without cost to the A.D.S.) for a report to the Spring Board Meeting to be held in April 1964 at Asheville, North Carolina. This is the report.

The computer at the Iowa Methodist Hospital is called "George" for the obvious reason that life and custom being what they are, there is a great tendency to "let George do it." George's full name is I.B.M. 1440. To his lot fall many of the chores which are considered too tedious, too time consuming, too dull, or too unrewarding for human endeavor. His work extends from the interpretation of electrocardiograms on the one hand, to printing payroll checks with the other—checks from which George automatically deducts income tax withholdings, social security, insurance premiums, etc.; George consented to help the A.D.S. in his spare time.

Mrs. Roberta Watrous, Harry Tuggle, Bill Pannill and I discussed the type of data which we felt should be submitted to George. After a number of letters we decided upon:

(1) Name of daffodil

(2) Seed parent

(3) Pollen parent

(4) Breeder

(5) Classification and color code

(6) Season of bloom

(7) Height of plant

(8) Chromosome count

(9) Fertilty of seed and pollen

(10) Date introduced

(11) Duplicate names and "Apocryphia"

For George this is a kindergarten exercise: he can store up to two million items of information at a rate of 62,500 items per second. His "recall" of random bits of information is almost instantaneous, and he is capable of "printing out" his messages at a rate of 650 lines per minute, with 128 characters per line. Really the whole job is to supply accurate information to George. Presently there are punch cards on approximately 3200 daffodils in George's memory bank. The data on each of these cards were originally written out by me and were derived from: The **R.H.S. Daffodil and Tulip Year Books** from 1934 through 1964; from the **Annual Reports of The Midland Daffodil Society**; from **Herbertia**; and Mrs. Roberta Watrous, Mr. Harry Tuggle, Mr. Grant Mitsch, Mrs. J. Lionel Richardson, Mr. Thomas Martin, Mr. Michael Jefferson-Brown, P. De Jager & Sons, Inc., and from my personal correspondence with the late Guy L. Wilson. Grant Mitsch and Mrs. Richardson made information available to George from their breeding books; Thomas Martin produced a host of "lost" parentages, and Harry Tuggle proofread George's output with a friendly but critical eye.

Let us examine the information under the various categories:

(1) **Name:** Nineteen spaces are available for printing the individual daffodil's name. Less than a handful of names are longer, and suitable abbreviations easily come to mind.

(2) **Seed parent:** Alloted nineteen spaces. If the seed parent is definitely unknown, the spaces are left blank. If the seed parent is known with some degree of probability, the questionable name is followed by an asterisk. (Computers have no question marks in their language, so I substituted an asterisk which heretofore George had regarded without suspicion.) As a matter of fact, during one run of data processing, we lost the asterisk in the machine through utter perversity, and it required several hours to relocate it.

(3) **Pollen parent:** Rules of handling as applied to the seed parent, **vide supra.**

(4) **Breeder:** Suitable abbreviations of the breeders' name are supplied to George; but the computer prints out the full name on request.

(5) **Classification and color code:** George is letter perfect in the "Revised System for the Classification of Daffodils, 1950." Each daffodil, where possible, has been placed in the appropriate division, i.e., 1a, 2c, 3b, etc. However, it seems to both George and me that this system admirably codes the physical formation of the bloom, but the system is not sufficiently descriptive of the colors present in the flower.

Let me enlarge upon this, my favorite subject. Galway, Ceylon and Aranjuez are classified as 2a. Yet, Galway is a self-yellow; Ceylon is a red-cup, and Aranjuez has a yellow-cup rimmed with red. These differences are important to you and me, in our gardens, and to any judge on the show bench. A further example: Polindra, Debutante, Kilworth, Green Island and Interim are all classified 2b. Yet, does not their cup coloration make them vastly different flowers—and these differences are easy to describe.

George and I have worked out a color code which couples readily with the approved classification system; and which allows the computer to "print-out" a short color description of a bloom, where such a description is helpful. Colors used in daffodil descriptions are: yellow, white, red, orange, pink and green. The computer recognizes these colors. The daffodil perianth is solidly colored and in the first three divisions the perianth color is indicated by the classification system. But the cup colors, are left dangling. George and I have arbitrarily divided the cup (or trumpet) into three zones: the "eye zone" or the inner 1/3rd of the cup lying adjacent to the perianth; the "middle zone" or middle 1/3rd of the cup; and the "rim" or outer 1/3rd of the daffodil cup. Colors may be coded in sequence which describe these areas.

Let us see how this works: Polindra 2by, which George prints as Polindra 2b yellow. Debutante 2bp or Debutante 2b pink. Kilworth 2bgrr, or Kilworth 2b green-red-red. Green Island 2bgwy, or Green Island 2b green-white-yellow. Interim 2byyp, or Interim 2b yellow-yellow-pink.

Unlike the above, in divisions 4 through 11, the first color code applies to the perianth, and the remainder to the cup or

center. In these divisions, the standard classification has heretofore denoted only horticultural configuration, and there has been no connotation of color. These flowers are now more adequately described. Example: Double Event 4wwy is printed out to indicate a double daffodil with a white perianth and a white and yellow center. Thoughtful 5ayy indicates a long-cup triandrus with yellow perianth and cup. Dove Wings 6awy brings to mind a long-cup cyclamineus with white perianth and a yellow cup. Sugar Bush 7bwo describes a short-cupped jonquil with a white perianth and an orange cup. And so on through the classification. I realize that it sounds complicated and confusing, but when George prints out his little accessory color descriptions, it is most convincing. A little later and he will show you.

(6) **Season of bloom:** This is based on the usual 1-6 periods of bloom, from 1=extra-early to 6=late. The numeral 7 is used to indicate varieties which bloom at odd times, such as certain fall or winter blooming sorts.

(7) **Relative height of plant:** The "operative word" here is **relative.** Daffodil heights are dependent upon climatic and cultural factors. Yet, a daffodil which grows "tall" in Iowa, probably does so in Connecticut, Alabama and California; to say nothing of England, Ireland, and Tasmania. The word "tall" is merely any grower's appraisal, against his own experience with other daffodils. The actual code is: 4=tall; 3=average; 2=short; 1=miniatures, by definition. Such **relative heights** are fairly constant; but measurements by inches are meaningless.

(8) **Chromosome count:** Seemingly few of these are recorded. George is avid for the knowledge, whether the count is 14 or 52.

(9) **Fertility:** It may be valuable to know whether a certain daffodil is commonly considered fertile or sterile. A simple code reminds George of these facts, if known. S=seed fertile; P=pollen fertile; O=sterile. Also, the computer has already supplied a large store of knowledge in this area. Any daffodil that has appeared in George's file as a parent, is automatically marked by the computer as fertile.

(10) **Date:** The last two figures of the date are recorded; the century is left up to the reader. 02 refers to 1902, and we won't have to worry for another 38 years.

TABLE 1

NAME	SEED PARENT	POLLEN PARENT	BREEDER		CLASS & COLOR	S	HT	CC	FT	DT
ABALONE	POLINDRA	GREEN ISLAND	GRANT E. MITSCH	2B	YELLO YELLO PINK	4	4			62
ACROPOLIS	FALAISE	LIMERICK	J. LIONEL RICHARDSON	4	WHITE WHITE RED	4				55
ANGEL	*	*	GUY L. WILSON	3C	GREEN WHITE WHITE	3				60
AVENGER	KILWORTH	ARBAR	J. LIONEL RICHARDSON	2B	RED	4				57
BERYL	CHAUCER	CYCLAMINEUS	PERCIVAL D. WILLIAMS	6B	YELLO ORANG		2			07
BETHANY	BINKIE	SEEDLING 1	GRANT E. MITSCH	2D		4	3			58
SEEDLING	KING OF THE NORTH	CONTENT	GRANT E. MITSCH							
BLARNEY,S DAUGHTER	BLARNEY	SEEDLING 1	J. LIONEL RICHARDSON	2B	ORANG ORANG YELLO				S	48
SEEDLING	SERAGLIO	AVIEMORE	J. LIONEL RICHARDSON							
BUTTERSCOTCH	GOLDEN TORCH	GALWAY	GRANT E. MITSCH	2A	YELLO	3	3			63
CAMELOT	KINGSCOURT	CEYLON	J. LIONEL RICHARDSON	2A	YELLO					
CHICKADEE	RUBRA	CYCLAMINEUS	GRANT E. MITSCH	6A	YELLO ORANG	3	2			61
DEBUTANTE	WILD ROSE	ROSE CAPRICE	J. LIONEL RICHARDSON	2B	PINK	3				56
DESCANSO	POLINDRA	FROLIC	MURRARY EVANS	1B	YELLO	3	4			64
DESDAMONA	SEEDLING 1	RASHEE	GUY L. WILSON							
SEEDLING	BRUNSWICK	GREENORE	GUY L. WILSON							
DICKCISSEL	BINKIE	JONQUILLA	GRANT E. MITSCH	7B	YELLO WHITE	5	3			64
FINOLA	DUNLUCE	* BROUGHSHANE	* GUY L. WILSON	1C		2				58
GREENLAND	SEEDLING 1	CHINESE WHITE	GUY L. WILSON	2C		3			SP	49
SEEDLING	QUARTZ	NAXOS	GUY L. WILSON							
KING ALFRED	PS.OBVALLARIS MAX.	AUTO-TETRAPLOID	JOHN KENDALL	1A		2	4		SP	99
LORD KITCHENER	MINNIE HUME	WEARDALE PERFECTION	MRS. R.O. BACKHOUSE	2B	YELLO				SP	05
NEWCASTLE	NIPHETOS	KANCHENJUNGA	W.J. DUNLOP	1B	YELLO	3				57
NYLON	B.ROMIEUXII	B.MONOPHYLLUS	D. BLANCHARD	11	WHITE WHITE	7	1	28	SP	49
PEASE BLOSSOM	JUNCIFOLIUS	T.ALBUS	ALEC GRAY	7B	YELLO YELLO	5	1			38
ROSE ROYALE	SEEDLING 1	SALMON TROUT	J. LIONEL RICHARDSON	2B	PINK				SP	58
SEEDLING	ROSE OF TRALEE	LISBREEN	J. LIONEL RICHARDSON							
SAMBA	TRIANDRUS	*	BARR & SONS	5B	YELLO RED	4	1			52
SILKEN SAILS	GREEN ISLAND	CHINESE WHITE	GRANT E. MITSCH	3B	WHITE WHITE YELLO	5	4			64
WHITE SENTINEL	BEACON	SEEDLING 1	REV. GEO. H. ENGLEHEART	2C					SP	26
SEEDLING	*	*		2C						

The date used is the year of registration, unless this was preceded by considerable use of the flower in shows or in breeding.

(11) **Identical names and "Apocrypha":** Occasionally the same name has been given to two or three different daffodils. The computer indicates this repetition by a a code, which sets apart the older varieties no longer available.

Early daffodil breeders were legendary characters; and a vast store of tales, anecdote, information and misinformation has formed a fascinating "Apocryhpa". George has winnowed these data. Occasionally a breeder has assigned one parentage to a plant at one time, and a different breeding on another occasion. George has tried to judge these variations impartially; and, when unable to reach a decision, he has given both breedings with a coded symbol to indicate the discrepancy.

On yet other occasions when the parentage of an important daffodil has been unknown, famous breeders have hazarded educated guesses as to the identity of the unknown parents. The daffodil Fortune is a case in point. When P. D. Williams and the Rev. Engleheart discussed Fortune's possible ancestory, George took special note: the computer contains two **possible** parentages for Fortune. Both of these may well be wrong (and probably are!)—but a guess by "P.D." is better than an asterisk by George.

The above is an outline of the data that George mulls over. The computer may reproduce the facts, or it may sort and choose among them. These latter faculties enable George to do many things for us and are governed by the instructions which George has received—these instructions are known as the "program". George has been programmed by Bob Henderson, an I.B.M. engineer. The instructions or commands given the computer required 450 punched cards. This meant many hours which have actually been donated to the A.D.S. by Mr. Henderson and the I.B.M. Corporation. I would no longer hazard to estimate the hours I have put into this project.

Here are a few things that George can do for you:

(1) List out the information contained in the Bank about any or each daffodil. (See table 1.)

(2) List all daffodils bred by a given breeder. At the Asheville meeting of the A.D.S., George presented Mrs. J. Lionel Richardson with a complete and current list of her introductions.

(3) List all the known children of any daffodil or daffodil cross. As a case in point, the children of Green Island make a fascinating study.

(4) Provide lists by classification, as all 2b's; or provide lists by colors, as all pink daffodils.

(5) Lists may be printed as regards season of bloom, or height of plant—a list of miniatures could be provided. Certain chromosome counts could be ferreted out, or data concerning fertility is possible in list form.

(6) Even the dates are interesting. It is fascinating to print out the daffodils introduced in each decade, and to note how tastes change. It is possible to follow the influence of major breeders, or certain of their plants.

(7) George's most ambitious and sophisticated accomplishment is his ability to print out the family tree (to seven generations) of any daffodil recorded in the Daffodil Data Bank. As incredible as it sounds, the name of almost any daffodil can trigger the computer and within a few moments, the family tree of the plant is deftly printed out. Then without further command, George proceeds to list the total data contained on each daffodil concerned in the genealogy—in correct genealogic order. In other words George can supply a family tree, followed by a short biography of each member of the family.

This fall, a friend of mine, who lives in Virginia, obtained a bulb of Ulster Queen. Rumor has it that he paid American dollars and two units of blood. I just couldn't wait until April of 1965 to see this bloom, and inserted the name "Ulster Queen" into the computer. The family tree which George has printed out shows the stuff that really fine white trumpets are made of. Only someone like Guy Wilson could leave such a bequest to daffodil lovers. Ten breeders; two life times; tender loving care; and pseudo-narcissus obvallaris maximus is transformed into a glistening white trumpet—by magic and by labor. (See table 2)

And now to paraphrase: "Ask not what George can do for you; ask what you can do for George". What started as an experimental enterprise of the American Daffodil Society has now been accepted and dignified—George has been given the title of the Daffodil Data Bank. This is **your** bank and deserves your

1 ULSTER QUEEN

2 EMPRESS OF IRELAND

3 VIGIL

4 GUARDIAN

5 KANCHENJUNGA

6 COURAGE

7 KANCHENJUNGA

8 NIPHETOS

9 TROSTAN

10 SEEDLING

11 ASKELON

12 SEEDLING

13 ASKELON

14 SEEDLING

15 ASKELON

20 CONQUEROR

21 WHITE KNIGHT

18 KING ALFRED

19 ASKELON

22 SEEDLING

23 NEVIS

25 NAXOS

26 SEEDLING

27 NEVIS

28 CONQUEROR

29 WHITE KNIGHT

30 SEEDLING

31 NEVIS

42 MADAME DE GRAAFF

43 MADAME DE GRAAFF

36 PS.OBVALLARIS MAX.

37 AUTO-TETRAPLOID

38 SEEDLING

39 NEVIS

44 WEARDALE PERFECTION

45 DUKE OF BEDFORD

46 KING OF THE NORTH

47 SEEDLING

52 WEARDALE PERFECTION

53 DUKE OF BEDFORD

54 KING OF THE NORTH

55 SEEDLING

58 MADAME DE GRAAFF

59 MADAME DE GRAAFF

60 WEARDALE PERFECTION

61 DUKE OF BEDFORD

62 KING OF THE NORTH

63 SEEDLING

84 EMPRESS

85 PS.ALBESCENS

86 EMPRESS

87 PS.ALBESCENS

88 PS.ABSCISSUS

89 *

104 PS.ABSCISSUS

105 *

116 EMPRESS

117 PS.ALBESCENS

118 EMPRESS

119 PS.ALBESCENS

120 PS.ABSCISSUS

121 *

76 WEARDALE PERFECTION

77 DUKE OF BEDFORD

78 KING OF THE NORTH

79 SEEDLING

92 KING ALFRED

93 GLORY OF NOORDWIJK

94 TRIANDRUS

95 *

108 KING ALFRED

109 GLORY OF NOORDWIJK

110 TRIANDRUS

111 *

124 KING ALFRED

125 GLORY OF NOORDWIJK

126 TRIANDRUS

127 *

TABLE 2 (Part 1)

TABLE 2 (Part 2)

NAME	SEED PARENT	POLLEN PARENT	BREEDER	CLASS & COLOR	S	HT	CC	FT	DT
ULSTER QUEEN	EMPRESS OF IRELAND	VIGIL	GUY L. WILSON	1C					
EMPRESS OF IRELAND	GUARDIAN	KANCHENJUNGA	GUY L. WILSON	1C		2	3	SP	52
VIGIL	COURAGE	KANCHENJUNGA	GUY L. WILSON	1C		3	3	SP	47
GUARDIAN	NIPHETOS	TROSTAN	GUY L. WILSON	2B		3	4	SP	42
KANCHENJUNGA	SEEDLING 1	ASKELON	GUY L. WILSON	1C		2	3	SP	34
COURAGE	SEEDLING 1	ASKELON	THE BRODIE OF BRODIE	2C		3		SP	33
NIPHETOS			PERCIVAL D. WILLIAMS	2C		3		SP	27
TROSTAN	KING ALFRED	ASKELON	GUY L. WILSON	1B		2		SP	38
SEEDLING	CONQUEROR	WHITE KNIGHT	THE BRODIE OF BRODIE	1C					
ASKELON	SEEDLING 1	NEVIS	THE BRODIE OF BRODIE	1C				SP	23
SEEDLING	SEEDLING 2	NAXOS	THE BRODIE OF BRODIE						
KING ALFRED	PS.OBVALLARIS MAX.	AUTO-TETRAPLOID	JOHN KENDALL	1A		2	4	SP	99
CONQUEROR			PERCIVAL D. WILLIAMS	1B			2	SP	07
WHITE KNIGHT	MADAME DE GRAAFF	MADAME DE GRAAFF	DEGRAAFF BROS. LTD.	1C				24 SP	07
SEEDLING	WEARDALE PERFECTION	DUKE OF BEDFORD	THE BRODIE OF BRODIE	1B	*				
NEVIS	KING OF THE NORTH	* SEEDLING 1	THE BRODIE OF BRODIE	1C		2		SP	16
NAXOS			REV. GEO. H. ENGLEHEART	2C				SP	23
PS.OBVALLARIS MAX.				10		2	3	14 SP	
AUTO-TETRAPLOID									
MADAME DE GRAAFF	EMPRESS	PS.ALBESCENS	DEGRAAFF BROS. LTD.	1C				31 SP	87
WEARDALE PERFECTION	PS.ABSCISSUS	*	WILLIAM BACKHOUSE	1B				SP	94
DUKE OF BEDFORD			BARR & SONS	1B				SP	99
KING OF THE NORTH	KING ALFRED	GLORY OF NOORDWIJK	THE BRODIE OF BRODIE	1A				S	27
SEEDLING	TRIANDRUS	*	REV. GEO. H. ENGLEHEART	1C					
EMPRESS	PS.BICOLOR	PSEUDONARCISSUS	WILLIAM BACKHOUSE	1B				SP	90
PS.ALBESCENS				10				SP	
PS.ABSCISSUS				10				S	
GLORY OF NOORDWIJK	MADAME DE GRAAFF	VICTORIA	J. DEGROOT AND SON	1B				SP	02
TRIANDRUS				10				SP	

support. George would appreciate your help along the following lines of endeavor.

(1) If a breeder believes a daffodil is worth registering, then the parentage of that daffodil is worth knowing. The A.D.S. is dependent upon the R.H.S. for the proper registration of daffodils, a labor for which we are all grateful. But can we not expect the breeding of daffodils, where known, to become a part of the required information? If the breeding is uncertain, but a parentage is considered likely, this should be indicated, as well. George can handle information of this type, and we shall each stand to profit as the store of information increases.

(2) No public record is available of the parentages of many standard commercial daffodils—many of them of Dutch origin. If these parentages are lost, it is a great pity; if the lines of breeding are known, they should be made available. Dutch growers sell millions of beautiful healthy daffodil bulbs in the U.S.A. each year; I think we deserve to know the ancestors of the things we are planting.

(3) The varieties from the Antipodes need amplification and classification. Some of the most ardent daffodil growers (and breeders) live in New Zealand, Australia, and Tasmania. George needs access to their daffodil breeding books. Perhaps the editors of our new daffodil publication will countenance the following advertisement: **George, a digital computer with random access, desires contact with ardent Antipodean daffodil grower. Object: mutual advantage".**

(4) George needs little bits and pieces of information: color descriptions and data on older varieties which you have grown. Data on daffodils registered but not introduced. George needs fertility facts, chromosome counts, etc., etc. Each and any of you can help with a postal card, a note or a letter.

(5) George requires your advice regarding future ramifications of his efforts. If you wish, George could advise us of diseased varieties—certain entire daffodil clones are virus riddled. Certain apparently healthy varieties are infected also—"Typhoid Marys" of the narcissus world. George could provide this information if you think it important, and if **you** are willing to work at digging out the facts for George.

Along the same line, the computer could indicate whether or not certain varieties were susceptible or resistant to basal troubles—a very real problem in some parts of our country. You present the facts, and George will organize and bank them for you—for future reference.

Lastly, George is supplying his services without charge to the A.D.S. Daffodil Data Bank. George has expensive tastes, and it costs approximately $5,000 per month to maintain him in his air conditioned—plate glass suite. He depends upon a battery of ancilliary equipment, and needs the services of trained and expensive personnel. Nevertheless, George regards his services in the light of a restful diversion; there is always a compulsion to give time, energy, knowledge and pleasure to an interested friend.

George needs friends, too. Simple requests will be answered in spare time, and without charge. Complicated or long listings can be had for the postage and cost of materials—surely not more than a dollar or two.

Address:
GEORGE
Computer Center
Iowa Methodist Hospital
Des Moines, Iowa

Two other plant societies are fascinated by George's abilities—are you?