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COMPUTER USE IN THE UNITED STATES: 1984



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COMPUTER USE IN THE UNITED STATES: 1984

By Robert Kominski

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Computer Use in the United States: 1984

HIGHLIGHTS

All percentages include 90 percent confidence intervals. For details of calculation and interpretation, see Appendix B, Source and Reliability of Estimates.

- In October 1984, 6,980,000, or 8.2 percent ($\pm .6$), of all U.S. households reported that they had a computer.
- Ownership of a computer was most likely in households with incomes of \$50,000 or more (22.9 percent ± 1.2), and least likely in households with incomes of \$10,000 or less (1.7 percent $\pm .2$).
- Among children ages 3 to 17, 15,542,000, or 30.2 percent ($\pm .5$) used a computer either at home or school (some in both places). At home, 15.3 percent ($\pm .4$) had a computer available, and of these children, 74.2 percent (± 1.2) used it.
- About 31,099,000 persons ages 18 and above, 18.3 percent ($\pm .2$) of the adult population, reported that they used a computer somewhere—either at home, work or school (or some combination).
- Fifteen million adults (9.1 percent $\pm .2$) had a computer at home, and of those about half (53.3 percent ± 1.0) used it. Of the over 100 million employed adults, 24,172,000, or 24.6 percent ($\pm .3$) used a computer at work.
- By the fall of 1984, computers were a part of many lives: of the 221,268,000 persons ages 3 or above, 46,641,000—21.1 percent ($\pm .2$)—were reported to use a computer in some direct way.

INTRODUCTION

One of the most important technological innovations of the 20th century has been the development and use of the high-speed, multipurpose computer. While rudimentary precursors can be identified as much as 100 years earlier, the first modern multipurpose computer used in a large-scale daily operational context was the Univac I, purchased by the U.S. Census Bureau in 1951. The years since this first major application of computer technology have seen such a variety of changes and improvements, however, that early computers now seem simple by comparison.

Advances in microelectronic circuitry have been one of the major innovations, allowing the physical size and cost of machines to dramatically decrease, while yielding far greater amounts of computing capacity at much faster rates of speed. While the Univac I was capable of carrying out about 2000 instructions per second (e.g., addition and division), typical large-scale computers of today can often perform in excess of 20 million instructions per second.

In the early 1970's, a series of major innovations occurred, highlighted by the development of microprocessors and the microcomputer. Although much smaller in size than conventional computing equipment then in use, these machines were still capable of performing many basic computing tasks. At first, these machines were primarily the domain of electronic and computer hobbyists, but as microelectronic technology and parts became more widely available, microcomputers started to be mass-produced. By the late 1970's several different brands of microcomputers were commercially available, and within a few years, numerous microcomputer companies were in business. In 1984, TIME magazine gave its "Man of the Year" award to the computer.

The "computer revolution", as some refer to it, has touched our lives in literally hundreds of different ways. In many respects, the role of the computer is transparent to us: we often do not interact directly with it, but merely see its end effects—electronic banking, for instance. For many of us, however, actual interaction with a computer is a part of our lives, be it at work, school, or home.

While some manufacturers provide estimates of how many computers they produce or sell, no overall market total exists. Some organizations keep inventories of the computers they own, but they do not always have reliable estimates of their use. Also, it is not known how many of the small "personal computers" that have been sold are in homes, as opposed to offices. With some work, one might be able to generate an estimate of how many machines are out there, but this would still not address the more fundamental question: "How many people are using them?". If computers are becoming more and more a part of our lives, we need to know how they are distributed, who uses them, and how they are being used. This report provides a first attempt at providing this information on a national level.

The tabulations in this report are produced from data collected in October 1984 as part of the Current Population Survey (CPS). The CPS, a monthly survey of the U.S. civilian noninstitutional population, is designed to provide estimates of the labor force and employment conditions in the Nation. In some months, additional questions are asked on special topics; in October 1984 the National Center for Education Statistics sponsored the inclusion of a series of items on computers. These questions concerned the availability of computers to persons at home and the use of computers when one was present at home, work, or school. Further information about the survey and the specific questions asked is provided in Appendix A, Survey Definitions and Explanations.

SUMMARY OF NATIONAL ESTIMATES

Computers may be used in any of several contexts. For children, use is possible both at home and school, while adults may also use a computer at work. The survey attempted to estimate use in each specific domain, as well as exposure and use overall regardless of setting. Several tables provide different pieces of information that tell the general story. For example, one might ask what proportion of households had computers; table 1 provides this information. In October 1984, 6,980,000, or 8.2 percent, of all U.S. households reported that they had a computer, with about 70 percent of those households having obtained the computer either in 1983 or 1984.¹ Ownership of a computer was most likely (22.9 percent) in households with yearly incomes of \$50,000 or more, while only 1.7 percent of households with income below \$10,000 reported ownership. Households with school-age children were three times as likely as those without to have a computer (16.0 vs. 5.1 percent). Finally, among all householders, those ages 35 to 44 were most likely (15.8 percent) to have a computer in their home.

Another way to look at computer use is in terms of the numbers of individuals who use them. The other tables of this report concentrate on use in this context, with separate tables and discussion for children and for adults. The basic results are summarized here. Table 2 shows that 15,542,000, or 30.2 percent of children ages 3 to 17 used a computer either at home or school (some in both places). At home, 15.3 percent had a computer available, and 74.2 percent of the children used it. In school, 28 percent of the 45.6 million students enrolled were reported to use a

computer. (Note that this survey did not assess the number of students with a school computer available, but simply the number who used one at school.)

Table 4 shows similar access and use data for adults. About 31,099,000 persons ages 18 and above, 18.3 percent of the adult population, reported that they used a computer somewhere--either at home, work, or school (or some combination). About 15 million adults (9.1 percent) had a computer at home, and, of those over half (53.3 percent) used it. Of the over 100 million employed adults, 24,172,000, or 24.6 percent, used a computer at work, and 3,839,000 (30.8 percent) of the adults enrolled in school said they used one there. Clearly, by the fall of 1984, computers were a part of many lives. Of the 221,268,000 persons aged 3 or above, 46,641,000 (21.1 percent) were reported to use a computer in some direct way.

ACCESS AND USE BY CHILDREN

About 15 percent of all children 3 to 17 years of age had access to a computer at home, and of these, 74.2 percent used the machine. However, access and use might be expected to vary depending upon other life circumstances and conditions.

In terms of access, there were several significant differences except in access based on the age of children. Apart from very young children, 3 to 5 years of age, access ranged between 12.6 and 19.0 percent for single-year age groups between 6 and 17, with no clear trend notable.

For race groups, White children were most likely to have a computer at home (17.1 percent) and Black children least likely (6.1 percent). Hispanic children were also far less likely to have a home computer than non-Hispanic children (4.6 vs. 16.1 percent). Boys were more likely (16.8 percent) to have a home computer available than girls (13.6 percent).

In regional terms, children in the Northeast were most likely to have a computer in their home (19.3 percent), while children in the South were the least likely (12.3 percent).

The probability of having a computer at home increased significantly as the education of the householder increased. Only 3.5 percent of the children in households where the householder had 0 to 8 years of school had a home computer, compared with 30.4 percent of the children living with householders with 4 or more years of college. Similarly, there was a strong relationship between the presence of a home computer and reported family income. About 3.4 percent of the children in households with family income below \$10,000 had a home computer, whereas 37 percent of those children in households with income above \$50,000 had one.

¹About 2.5 percent of the households did not respond to the survey items. Item nonresponse has not been removed by imputation; percentages in this report exclude nonresponse. Detailed tables 1-5 show the level of nonresponse for key items of computer access and use.

Finally, the children of householders in managerial and professional positions were the most likely of all general occupational groups to have a computer in their home. Many of these characteristics are not independent of one another, but the data show that there were real differences in the access of children to computers in the home.

Many of the differences that are apparent in access are less clear or vanish altogether when one concentrates on patterns of use. Columns 4 and 5 of table 2 show the usage patterns of children in homes where a computer is available. Overall, 74.2 percent of children with computers at home were reported to use them. While there are some differences among age groups, there is no simple pattern: use at home ranges from 71 to 83 percent for the single-year age groups from 6 to 17. There are no measured differences among race and Hispanic categories when use, instead of availability, is examined. Boys, however, are much more likely than girls to use a computer if one is in the home (80.3 vs. 66.4 percent). Regional differences in usage are detected only between the Northeast and South. In terms of householders' education, only those children of householders with little education (0-8 years) experienced significantly lower levels of usage. With respect to family income, there were no significant differences in use by children in income groups of \$15,000 or more, while children in the \$10,000-14,999 range had significantly lower levels of use from all income categories above it. The examination of differentials in both availability and use illustrate that most apparent differences are based on the ability and/or propensity to own a computer.

One mechanism for correcting differentials in access is the schools. Ideally, schools--offering equal access to all--may work to compensate for inequities that are a reflection of social background. Columns 9 and 10 of table 2 show the number and percentage of students who reported that they use a computer at school. In general, about 28 percent of all students said they use a computer at their school.

In terms of age groups, students 10 to 13 years old were the most likely to use a computer at school (ages 3 to 5, 6.4 percent; 6 to 9, 26.8 percent; 10 to 13, 37.8 percent; 14 to 17, 28.7 percent). Table A shows this higher use rate in terms of the middle grades 5 through 8 (where 10-to-13-year-olds are generally enrolled) in both public and private schools.

There are also significant differences in the use of computers at school based on Hispanic origin and sex, with non-Hispanics (28.9 percent) and boys (29.0 percent) exhibiting greatest levels of use, respectively. Use by Blacks (15.9 percent) is the lowest of any race group.

Among the regions, children in the Midwest showed the highest levels of school use (33.9 percent), while those in the South were lowest (21.3 percent).

Perhaps most notable is the relationship of school use with householders educational attainment and family income. In both cases, school use by children generally becomes more likely with increases in either householder's educational attainment or family income. Both of these phenomena indicate a possible indirect effect of family socioeconomic status on computer use through the quality and equipping of schools. Thus, while it might be expected that within schools equal use across population subgroups is promoted, observed differences may be due to factors outside, or between, schools.

One way of considering the indirect effect of family background as reflected across schools is by examining distinctions between public and private schools. Private school generally involves some direct monetary cost on the part of families, as does the acquisition of a computer. Both items (private schools and computers) might be viewed as investments families may make in furthering the education of their children. Consequently, differences in computer access that are cost-related may also be reflected by the public-private dimension.

Table A shows the levels of computer use by school children, distinguished by grade levels and type of school. In general, private school students have consistently higher computer use at home, at school, and in the combination of both locales. Only for school use in high school is the difference between public and private school students not statistically significant.

The final two columns of table 2 show the overall rates of computer use when both home and school are jointly examined. In general, about 30 percent of all children use computers, either at home or in school. Since some sociodemographic differences have been shown to exist in each locale, it is not surprising that these differences persist when they are considered together.

Most notable are the sex, race, and Hispanic origin differences, indicating greater overall usage patterns by males, Whites, and non-Hispanic children. In addition, the monotonic relationship of use with both family income and education of the householder is maintained. As noted earlier, however, these relationships may reflect the fact that the ability to afford a home computer is a fundamental force in determining who uses them.

In addition to the basic levels of access and use, it is possible to examine the ways children use computers as well as the frequency of use. Table 3 shows data for frequency and several different types of use of home computers. For most children, four kinds of uses are shown: video games, school-related activities, basic learning of the computer, and other activities. (Questions regarding the use of word processing

Table A. School and Home Computer Use by Public and Private School Students, Grades K-12: October 1984

(Numbers in thousands)

Type of school and grade	Total students	Use at school		Use at home		Home and school	
		Number	Percent	Number	Percent	Number	Percent
Public school:							
All grades.....	39,901	10,953	27.4	4,664	11.7	2,116	5.3
Grades K-4.....	14,722	3,236	22.0	1,401	9.5	570	3.9
Grades 5-8.....	12,382	4,383	35.4	1,679	13.6	903	7.3
Grades 9-12.....	12,797	3,334	26.1	1,584	12.4	643	5.0
Private school:							
All grades.....	4,320	1,382	32.0	761	17.6	396	9.2
Grades K-4.....	1,989	487	24.5	305	15.3	137	6.9
Grades 5-8.....	1,262	589	46.7	258	20.4	168	13.3
Grades 9-12.....	1,069	306	28.6	198	18.5	91	8.5

and household record activities were asked of persons ages 14 and older and are also shown here for children ages 14 to 17.)

Of the four uses, video games were reported most frequently (77.9 percent), however, "learning to use" was also a frequent response (71.4 percent). School-related use (34.8 percent) and "other" uses (18.5 percent) were not as commonly reported. Examining these different types of use across demographic subgroups, there are significant differences in video game and school use by sex, with both cases showing higher usage rates for boys. Overall, children with computers in their homes were reported to use them on average during parts of about 2.8 days per week. The frequency of use was significantly higher for Black children (3.8 days) than for Whites (2.8), and higher for boys (3.1 days) than for girls (2.4).

ACCESS AND USE BY ADULTS

Overall, access and use of computers by adults was somewhat less than that experienced by children; nevertheless, significant proportions of the adult population were involved with computers at some level in the fall of 1984. Tables 4 and 5 detail access and use patterns for persons ages 18 and above, similar to the detail for children shown in tables 2 and 3.

In terms of general use, 18.3 percent of the adult population used a computer somewhere--either at home, school, or work. In terms of home access, 9.1 percent of adults lived in a household where a computer was available. There was significant variation from this overall level along several different dimensions. For example, persons ages 35 to 44 were most likely to live in a household with a computer (16.8 percent), while persons age 65 and above were least likely (1.5 percent). At least part of this may be because persons in the 35-44 age group are among the most likely to have children at home. Similarly, access rates

were high for persons who were living in a married-couple household (10.9 percent). Blacks, Hispanics and females were all less likely to have a computer present in their household than were adults not of these demographic statuses.

The probability of having a computer at home increased with both family income and the education of the individual, with 22.4 percent of persons in households with yearly incomes of \$50,000 or more reporting ownership, and 17.6 percent of all persons with 4 or more years of college education living in a household where one was available. Across occupational categories a computer at home was most likely for persons who held managerial or professional positions (17.9 percent), while in terms of regional differences, persons in the South were the least likely to have a computer in their home.

Not all adults who had a computer in their home actually used it. Overall, 53.3 percent of all adults with a home computer reported using it. While some differences that exist in terms of access disappear when use at home is considered, others remain. Examination of the data for adults who have computers at home does not reveal different rates of use by race or Hispanic groups. Males, however, have rates of use (63.1 percent) that are substantially higher than those for women (42.8 percent), and use rates by persons age 25 to 34 are the highest of any age group examined (65.4 percent).

As with access, use also increases with the education of the individual; however, unlike access, use is just as likely for persons of the lowest family income category (53.7 percent) as it is for persons of the highest (55.7 percent), given that a home computer is available. In the context of occupations, home use is most likely for persons in managerial and professional positions (64.5 percent). While adults in the Northeast were among the most likely to have a computer in their home, they were also among the least likely to use it (49.8 percent).

Many adults also are exposed to computers in the course of their work. In October 1984, 24.6 percent of the adult population with jobs reported that they "directly used a computer at work." The question was worded in this way to discourage positive responses by persons who may benefit in their work from computers (i.e., a manager who receives daily computerized listings), but who do not directly interact with the computer (for example, by a keyboard).

In general, use of a computer at work was significantly more likely with higher levels of education. Among the general occupational categories, persons in managerial and professional positions (39.0 percent) and technical and administrative positions (38.7 percent) had by far the highest use rates at work.

Differences noted in the use of computers at work may reflect as much on the distribution of computers in the workplace as they do on the distribution of different persons across occupations. For example, higher rates of computer use in the workplace were reported by non-Hispanics (25 percent), persons aged 25 to 34 (29.4), and women (29.0).

In the case of women, the higher rate at work (which is not mirrored for all women in general) may be determined, in part, by the jobs women hold. Table B shows the numbers of employed adult men and women, detailed by occupation and industry. While the occupational category of "technical, sales, and administrative support" accounts for 19.3 percent of

all working men, it represents 45.1 percent of all working women. Part of this is explained by the fact that the category includes such specific occupations as sales clerks, secretaries, and administrative clerical workers. Within this category, computer use at work was reported by 32.7 percent of males, and 39.1 percent of females.

The second panel of table B shows a similar male-female comparison for workers by general industry classifications. The category of "finance, insurance, and real estate" does not account for a large proportion of all workers (8.6 percent of women, 4.8 percent of men), but 60 percent of the women in this industry used a computer on their job, compared with 43.9 percent of men. Workers in this industry include persons such as bank tellers and data keyers.

The lack of data on specific types of work activities does not allow this point to be expanded here, but it should be noted that higher rates of computer use in an occupation or industry do not necessarily mean that those positions require higher skill levels or yield higher wages or prestige. This report addresses the general issue of rates of use and exposure; detailed analyses of types of use and job quality are also important issues concerning the impact of computers, but cannot be explored with these data.

Just as computer use at work is a more relevant concept for adults than children, use at school is somewhat less relevant when speaking about the

Table B. Computer Use at Work, by Sex, Occupation, and Industry: October 1984

(Persons aged 18 and above. Numbers in thousands)

Occupation and industry	Men				Women			
	Number	Percent	Use computer at work		Number	Percent	Use computer at work	
			Number	Percent			Number	Percent
All persons	80,240	(X)	11,715	14.6	89,546	(X)	12,457	13.9
All persons with jobs	58,563	100.0	11,715	21.2	45,417	100.0	12,457	29.0
Occupation:								
Managerial/professional	14,768	25.2	5,702	38.6	10,468	23.0	3,716	35.5
Technical, sales, and administrative support	11,324	19.3	3,706	32.7	20,492	45.1	8,022	39.1
Service	5,199	8.9	447	8.6	8,230	18.1	327	4.0
Precision production, craft, and repair	12,026	20.5	1,143	9.5	1,144	2.5	146	12.8
Operators, laborers, and fabricators	12,352	21.1	642	5.2	4,568	10.1	234	5.1
Farming, forestry, and fishing	2,894	4.9	75	2.6	515	1.1	12	2.3
Industry:								
Agriculture, forestry, and fisheries ..	2,672	4.6	110	4.1	629	1.4	53	8.4
Mining	784	1.3	171	21.8	143	0.3	95	66.4
Construction	6,353	10.8	307	4.8	626	1.4	143	22.8
Manufacturing	14,251	24.3	3,430	24.1	6,866	15.1	1,813	26.4
Transportation, communication, and other public utilities	5,528	9.4	1,066	19.3	1,891	4.2	997	52.7
Wholesale and retail trade	10,876	18.6	1,846	17.0	9,975	22.0	1,686	16.9
Finance, insurance, and real estate .	2,798	4.8	1,227	43.9	3,889	8.6	2,338	60.1
Services	12,299	21.0	2,662	21.6	19,597	43.1	4,500	23.0
Public administration	3,002	5.1	897	29.9	1,803	4.0	834	46.3

Table C. Computer Use by Part- and Full-Time College Students, by Year of Enrollment and Place of Use: October 1984

(Numbers in thousands)

Enrollment	Total students	Place of use							
		Home		School		Work		Anywhere	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent
Part-time:									
All years	4,219	541	12.8	898	21.3	1,577	37.4	2,136	50.6
1-2 years	1,872	199	10.6	323	17.3	573	30.6	826	44.1
3-4 years	1,044	152	14.6	250	23.9	409	39.2	586	56.1
5 or more years	1,302	190	14.6	325	25.0	595	45.7	724	55.6
Full-time:									
All years	8,086	682	8.4	2,776	34.3	683	8.4	3,323	41.1
1-2 years	4,124	341	8.3	1,258	30.5	202	4.9	1,515	36.7
3-4 years	2,868	208	7.2	1,096	38.2	266	9.3	1,274	44.4
5 or more years	1,094	133	12.2	422	38.6	215	19.7	534	48.8

adult population. Nevertheless, for those 13+ million adults who were in school (mostly college) in the fall of 1984, a substantial proportion, about 31 percent, were using a computer at school. Patterns of use in school indicate that use was more likely by persons of "Other" races (38.2 percent) and males (35.8). Table C shows information on computer use at home, school and work, differentiated by enrollment status (i.e., full-time, part-time). The table shows that while computer use in school was more likely for students who were enrolled full-time, part-time students experienced greater overall rates of use both at home and at work. When all three locations of use are considered together, part-time students were somewhat more likely to use a computer somewhere (50.6 percent) than were those enrolled full-time (41.1 percent). For both full-time and part-time college students, use of a computer at school was more likely at the third year and beyond than during the first two years of school. Nevertheless, the overall level of use for college students, regardless of location, was about 44 percent, indicating that over half of the current college population was receiving no exposure to computers on a routine basis.

The simultaneous consideration of all possible areas where individuals might use computers--home, work, and school--shows that about 18 percent of the adult population used a computer in at least one of these places. Usage rates were highest among persons aged 25 to 44, Whites, non-Hispanics, men, and single individuals. Computer use is positively associated with both the education of the individual and family income. High rates of use in any place were reported by persons working full-time, in managerial/professional and technical/sales occupations; and in the finance, insurance and real estate industry category. In general, the data indicate that when all three locales of use are considered, many disparities remain in

terms of who uses computers. These distinctions do not stem from use patterns in a single place, but are often apparent in more than one setting.

In addition to the basic rates of use, we can also examine some of the purposes for which adults use their home computers (table 5). Six general uses and a residual "other" category are shown; persons were permitted to pick all responses that characterized their use of the home computer. The most popular choice was "learning to use" (59 percent), an obvious choice given the newness of the technology to most individuals. More specific activities, such as household record-keeping (40.2 percent), job-related activities (36.9), and word processing (32.9), were also chosen by substantial proportions of individuals. While "video games" was reported quite frequently (45 percent), school use (which could mean use either for the person individually or in assisting their child) was reported by a much smaller percentage (16) of all adults.

As might be expected, types of uses varied somewhat among different kinds of persons. Job-related uses were reported more frequently by older persons (ages 45 to 64), and individuals in managerial and professional occupations, while recreational uses (i.e., video games) were reported with greater frequency by younger persons and individuals living in large households. Overall, the median number of uses reported by adults was 1.8, and the median number of days per week during which the home computer was used was 2.6.

SUMMARY

Despite the short time that home computers have been with us, the extent of their diffusion and adoption has been somewhat remarkable. The analysis of access and use patterns as of the fall of 1984 shows

that a sizable proportion of the population, both young and old, were involved with computers directly, less than a decade after the introduction of microcomputers into the general retail market. The dissemination of computers, at least in the early stages represented by this survey, has not been uniform across the population, but has differentially affected the lives of subgroups of the population.

These data indicate that ownership and use of home computers are closely associated with many different characteristics, representing different kinds of persons, households and needs. The strong association of access and use with education and certain occupations identifies one group of users. Yet another condition, the presence of school-age children, reflects the role of computers as useful educational devices. Without doubt, one key factor limiting access is the cost of the technology, as the strong relationship between family income and home computer availability demonstrates. In general, there are fewer distinctions in terms of who uses a home computer, given that one is available, than there are in terms of which households have them.

Examination of use in other areas shows that many individuals gain exposure to computers in school or at work. At least some differences in school based availability may be due in fact to socioeconomic variability among the neighborhoods schools represent. Differences in access between students of private and public schools tend to support this notion.

At work, computer use may vary with the type of job, as differences by occupation and industry suggest. Without more detailed data on the specific uses of computers, however, it is not possible to determine the variation in the kinds of work that people in different types of jobs do with computers.

The data here suggest that large numbers of people have exposure to computers on a routine basis. Presumably, as cost considerations lessen (as they have

since the time when the survey was undertaken), a major barrier to universal acquaintance with this technology should be removed, not only at home, but in schools and the workplace as well. Future studies of this topic will allow us to determine the progress of this technology's diffusion.

ADDITIONAL TABULATIONS

The tables presented in this report summarize a set of more detailed tabulations of these data. Three packages of detailed tabulations are available. These packages provide the same general information as the report tables, but the data are tabulated independently by gender, race and age groups. Package A presents data on computer access, use, types of use and frequency of use for children; package B presents this information for adults; package C presents these data for all students: elementary, secondary and post-secondary. Each tabulation package is available for \$33 (reproduction costs). To place an order for one or more packages, specify the Computer Use Package(s) desired, include check for applicable amount (make checks payable to "Commerce-Census"), and send to:

Paul Siegel, Population Division, Bureau of the Census
Washington, D.C. 20233
(301)-763-5203

Computer Use Package A: Computer Use by Children
(108 pages) \$33

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