MEETINGS

A report on the meeting in the East will be contained in the next issue. Briefly, it was decided to have the next eastern meeting at Harvard on October 1-3. The meeting will start at 2:00 PM on friday and continue through sunday.

The invitation to have our first "global" meeting in Urbana, Illinois during the early summer of 1977 was extended. More details on these meetings will be forthcoming.

MANUALS

The Science Center at Harvard is willing to undertake the task of reproducing and distributing the manuals for UNIX. The enclosed order form may be returned no later than May 28, 1976. All orders received by that date will be part of the first printing. Closing dates for subsequent printings, if any, will be announced.

For logistical reasons, each of the manuals will be available only as indicated below, with 3 hole punching and no binding. Orders should be batched, one order per installation and will be mailed to a single address which must be at the users' group's address of record for the installation.

The "UNIX PROGRAMMER'S MANUAL" Sixth Edition dated May 1975 will be reproduced in its entirety. Most installations will want to remove several pages which most users need not know about.

"DOCUMENTS FOR USE WITH THE UNIX TIME-SHARING SYSTEM" Sixth Edition will be reproduced omitting sections 1 (Setting Up UNIX) and 13 (On the Security of Unix).

The price of each manual will be dependent upon the total number of orders for that manual and will range between $8.00, if 100 copies are printed, and $12.00, if as few as 10 copies are printed. The order form may be sent in advance of, or with purchase orders or checks. Assume the $12.00 figure. Correct invoices and refunds will be sent.

QUESTIONAIRE

The attached questionaire is the first step in the establishment of a data base on UNIX installations. When we get the replies, we will make the results available to the users' group via this newsletter and will establish a data base on the "hotline" UNIX system.

BUGS

A number of bugs were recorded at the Harvard meeting. A copy of that file was given to D. Ritchie and his fixes, replies, and comments will appear shortly.

A bug in pipe.s has been reported by Bill Mayhew at The Children's Museum. Use of a pipe destroys register R2, the third register variable. The fix is to edit, reassemble and place in the proper library.

```
ed source/s2/pipe.s
/1:/a
          mov     r2,-(sp)
.
/jmp/1
          mov     (sp)+,r2
.
w
q
as source/s2/pipe.s
mv n.out pipe.o
ar r /lib/libc.a pipe.o
```

How to Fix your PDP-11/40's Static Electricity Problems
for 49 Cents (Plus Tax)

Bill Mayhew
The Children's Museum, Boston, MA
March, 1976

Users of Digital's PDP-11 series computers (other than the recent 11/70) have been plagued for some time with various perplexing software/hardware problems that are related to the influence of static discharge on an otherwise-content machine. The problems have been known to take several forms:

1. Sudden disablement of a single terminal on a timesharing system;

2. Abrupt failure of the system as a whole for no apparent reason;

3. Sudden failure of all terminals except the console terminal;

4. Inexplicable halts and/or "impossible" traps.

The following are some suggested remedies for dealing with these (and related) problems. Some of them are part of the standard PDP-11 folklore, others are believed to be new. All have been used with success; the author's PDP11/40 system has now been run for nearly four weeks nonstop, prior to which it had crashed virtually daily.

1. DL11/terminal-related problems

When a single terminal appears to disappear from the system without warning, it is typically due to the sudden disappearance of the Interrupt Enable bit in one of the two device status registers in the terminal's associated control unit (DL11). Most frequently, these problems are instigated when a person with a high buildup of static electricity on his body or clothing comes in contact with a terminal, or when metal-legged chairs are bumped against the metal stand of a terminal. This phenomenon has been known to take place in spite of anti-static carpeting, and has occasionally demonstrated the rather bizarre capability of "turning off" a terminal many feet distant from the terminal into which the static was discharged!

The easiest method to deal with this sort of problem is simply to replace all metal-legged chairs in the terminal room with wooden ones. This approach has secured to relieve upwards of 90% of those difficulties. A second approach is to contact Digital Field Service; there is a device, the H7002 Static Eliminator, that can be installed on each DL11, where the cable from the terminal plugs into the short DL11 cable (note that this is applicable to 20-mA current-loop terminals only, but EIA terminals do not generally exhibit this particular problem anyway). According to representatives at the Waltham, MA Digital office, installation of the H7002 is covered under the service contract on your machine (assuming you have one); there has, however, been controversy on this point from other Field Service offices. If you encounter difficulty, please contact the author so that an attempt can be made to get a definitive ruling.

Yet a third approach is via software. Many Digital operating systems have incorporated modifications so that, every second (as determined by the real-time clock), the system cycles through all of the relevant DL device registers, forcing the interrupt-enable bits on. This may be necessary to adapt to your system

If you are experiencing a severe case.

II. KW11-associated problems

Static discharges through the cabinet of the system, the "power" lock switch on the front panel, etc. have frequently been known to cause the Interrupt Enable bit on the KW11 line clock to drop inexplicably. This typically will cause all terminals (except possibly the console) to "disappear" from the system, even though a glance at the front panel lights indicates that the system is behaving "normally". Aside from the general guidelines (for which see below), the best way to deal with this problem is via software. In UNIX, when the system is not busy, it executes a subroutine called idle(), which may be found in the source file n40.s (or n45.s) under the name "idle". Primarily, this routine executes the "wait" hardware instruction. Immediately before the "wait", one can insert a single instruction to force the clock's interrupt-enable bit on: "bis $100,*_lks" (note that _lks must be .globl'ed; it is set to point to the system clock _in main.c). Thus, every time the system enters an idle state, it will force the clock back on.

III. Front-panel problems

The final class of static problems typically occurs through the front panel. It may exhibit itself in several ways, either through inexplicable halts, traps to bizarre locations ("panic: trap" on UNIX), or other strange behavior.

There are two hardware fixes for this problem. Primarily, on PDP11/40's at least, it results from the fact that when the panel lock is enabled, the TTL gates served by the various front-panel switches are allowed to nearly float at a logical "high" level (through a 1K pull-up resistor). In practice, this design just doesn't provide sufficient noise immunity; if the halt switch happens to be down when a static discharge arrives, the noise pulse(s) are sufficient to fool the machine into thinking it's really been halted. Similar things can happen when any of the other switches are depressed, producing equally bizarre results, and virtually eliminating the utility of the "panel lock" feature.

First, the physical keyswitch lock is not connected to a good ground when you receive the machine. You should connect a length of heavy stranded wire (the heavier the better; if all you have is lamp cord, use several parallel lengths) between one of the screws on the mounting bracket for the keyswitch and one of the screws that secures the front-panel PC board to the chassis (i.e. ground).

Second, if you have an experienced electronics technician around, install a large capacitor to filter out the noise pulse from the static discharge. The accompanying diagrams show how this is done, both electrically (fig. 1) and mechanically (fig. 2). As it happens, the 11/40 KY11-D console already comes with a few convenient mounting holes in which to mount the capacitor. A suitable capacitor seems to be an electrolytic 15-microfarad, 35-volt, axial-lead capacitor, available from your local Radio Shack as part number 272-1014 for 49 cents.

Although the installation process is straightforward, please remember that you're dealing with a moby-kilobuck computer system. Only people that have significant electronics know-how should attempt it. The author assumes no responsibility for the accidental invocation of the PDP-11's self-destruct mechanism when you're through.
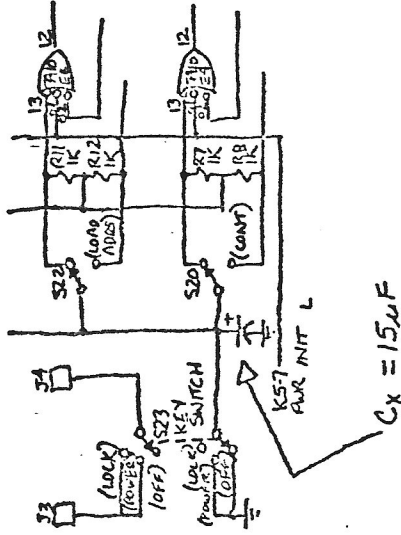
Figure 1.
Schematic

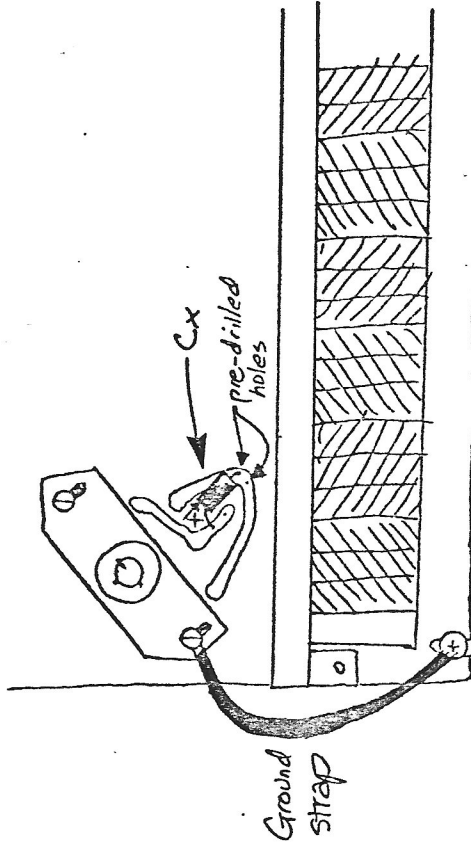(DEC print D-CS-5409701-0-1)

$C_x = 15 \mu F$

Figure 2.
Physical Installation

install the capacitor, and gain access to the keyswitch mounting bracket to permit installation of the ground strap, first pull the CPU assembly forward out of the system cabinet by about a foot. Then use a Phillips'-head screwdriver to remove the four screws (one at each corner) that hold the white bezel in place from the rear. Remove the bezel, and you will see five nylon screws that fasten the purple front panel to the machine; remove these with a standard screwdriver. With the machine powered down disconnect the electrical connections to the panel: 2 Berg connectors at the top left that connect various signals, and two pull-off tabs at the top right that are the power connections for the system power control unit. Now you can take off the front panel by unscrewing the three external nuts at the top, and removing the three Phillips screws along the bottom edge. Use a low-wattage soldering iron to install the capacitor; be sure to install it with the correct polarity, as shown in the figures! Re-mount the PC board to the chassis, but do not tighten the screws and nuts fully yet; first place the white bezel in position momentarily to make sure the switches on the PC board line up correctly. Once they do, fasten the board in place securely. Re-connect the four connectors removed earlier. Attach the ground strap as shown in the diagram (Fig. 2); replace the purple plastic panel, and the white bezel; power up the system, scruff your feet across the carpet a few times, and watch the CPU blithely ignore your attempts at panel-lock homicide.

General Guidelines

The solution of static problems in general can be aided by several general techniques. First, avoid the use of static-producing carpets in the machine room. Install a humidifier if necessary to keep humidity at a decent level, even on old dry days. Second, be sure the system is adequately grounded; install a heavy ground strap if necessary between the system cabinets and some good earth/building ground. If all else fails, consider hermetically sealing the machine and your terminal and re-installing the system at the deep end of your local YMCA's swimming pool...

5-3

PURDUE UNIVERSITY

SCHOOL OF MECHANICAL ENGINEERING

WEST LAFAYETTE, INDIANA 47907

March 26, 1976

Professor Melvin Ferentz
Physics Department
Brooklyn College of CUNY
Brooklyn New York 11210

Dear Professor Ferentz:

As a "new" user of the UNIX timesharing system, I have
found the "UNIX NEWS" very informative and helpful. The UNIX
system is slowly gaining recognition (and appreciation) from
the numerous PDP-11 sites throughout the Purdue campus. I feel
that your impressive list of users, as well as the descriptions
of their software development efforts will assist a few of us
in preaching the merits of UNIX.

I would appreciate being added to your subscription list.
Please send an invoice to my mailing address below:

Professor David C. Anderson
Computer Aided Design & Graphics Laboratory
School of Mechanical Engineering
Purdue University
West Lafayette, Indiana 47907
Phone: (317) 49-39385

Our laboratory supports research and instruction in inter-
active computer graphics. The activities include graphics
systems development (hardware and software), graphic languages,
multi-processor graphics, and a wide range of interdisciplinary
application areas. We intend to use UNIX as a base timesharing
system on which to build a multi-processor, multi-device inter-
active graphics environment.

The current configuration includes: PDP 11/40 with 56K
memory, LA 30, floating point, 2 RK05 disks, Dectape, 4 DL11-C,
2 DR11-C, 2 IMLAC PDS-1's (8K and 4K) with disk, 16 channel DAS
A/D system with a range of input devices, Tektronix 4014,
Calcomp 502 flatbed plotter, Interdata Model 70 with 8K words
and drum supporting a 3D display processor, Control Logic (Intel)
8008 micro, Altair 8080, ARDS storage tube and TTY 37.

At the present time we are only experimenting with UNIX,
anticipating a changeover from DOS within the year. Here is
some software that we have developed that may be of interest to
others:

A C program to read a named DOS linked file from disk or
dectape and copy to standard output.

Professor Melvin Ferentz
March 26, 1976
Page 2

A DR11-C word-oriented driver (presently using the
character queues).

An Interdata Model 70 cross-assembler based on (and totally
compatible) with AS. All variations of the branches were
consolidated into PDP-11 mneumonics - the assembler
handles all the short/long, register, forward/backward
garbage.

An extensive FORTRAN graphics library taking full advantage
of the Tektronix 4014 features.

A dynamic, structured graphics package for driving an
"intelligent" IMLAC PDS-1 from C or FORTRAN through a
DR11-C.

Sincerely,

David C. Anderson
Assistant Professor
Mechanical Engineering
and
Computer Science

DCA:mdv

Texas Student Publications

P.O. BOX D
AUSTIN, TEXAS 78712
(512) 471-5244

March 23, 1976

Prof. Melvin Ferentz
Physics Department
Brooklyn College of CUNY
Brooklyn, New York, 11210

Dear Prof. Ferentz:

The Computation Center of The University of Texas at Austin very recently received a distribution tape of UNIX and the document "SETTING UP UNIX—Sixth Edition". That document gives your name as the contact for a UNIX users' group. As the document was not dated, I have no idea how current it is. If you are no longer the person responsible for the UNIX users' group mailing list, perhaps you can redirect this letter to the proper person for me.

I was able to bring up UNIX with very little trouble. Now I am working on configuring it for our system. I am having some difficulties there because the only documentation I have so far is an old copy of the UNIX PROGRAMMER'S MANUAL, fifth edition.

With only the short introduction that I have had to UNIX I am completely enthralled by it. It is the most unusual, interesting, and nice operating system with which I have worked. In fact, I am so captivated by the system that I am very strongly disposed to convert our production operation to UNIX.

Naturally, we are hesitant to invest the time, money, and effort that would be required to convert our operation to UNIX without knowing more about it. I would very much appreciate whatever time and effort you can spare to answer some questions for me.

Before asking the questions I should describe our present system configuration and operation. Our machine is a PDP-11/45, without floating point hardware. Other DEC hardware is: 48K core memory, two RK05 disks, CR11 card reader, PA611 (typeset) high speed paper tape reader, PA611 high speed paper tape punch (8 level), two LPC01 photocomposition machine interfaces, a DH11 with

The University of Texas at Austin • Texas Student Publications Building 3.200

University of Technology

DEPARTMENT OF COMPUTER STUDIES

Head of Department
Professor D.J. EVANS

DWT/JMB

12th April, 1976

Prof. Melvin Ferentz,
Physics Department,
Brooklyn College of CUNY,
Brooklyn,
N.Y. 11210,
U.S.A.

Dear Professor Ferentz,

Will you please enrol us as a member of the UNIX users' group.

I should be extremely grateful for any available literature on UNIX that you could supply me, back issues of newsletters, program write ups, etc.... In particular I should like to contact anyone who has a 'standard' BASIC or BASIC-PLUS interpreter available, or who has interfaced D.E.C. software onto UNIX (perhaps through an RT-11 or DOS-11 emulator). In addition I have heard rumours that Steve Bourne is implementing ALGOL 68C at Bell, do you have any further information?

If there is not a U.K. UNIX sub-group in existence then we should be very willing to initiate such a group.

For your information our UNIX system will be running on a PDP 11/40 with 60K words of memory, 2 RK05 disc, a dual floppy disc drive (D.E.C. model - anyone with a driver??), about a dozen teletypes and V.D.U.s, a teletype 40 R.O.P. printer as a lineprinter and various odds and ends. It is used for undergraduate teaching and postgraduate research. We are currently running the 11/40 under RSTS V4 - hence the desire for BASIC or BASIC PLUS - and hope to cut over to UNIX completely in October 1976.

Software that we hope to implement under UNIX (timescale unknown at present) include the DECnet protocols, a logic patch-board simulator, possibly a LISP interpreter, a computer usage accounting package, UNIQUE - a machine independent JCL compiler for use on networks, a floppy disk driver, graphics packages, etc.

Looking forward to hearing from you.

Yours sincerely,

D.W. TAYLOR (Mr.)

16 lines, DQ11 synchronous interface, and operator console. We also have on order an LA36 to go on an additional DL11 line.

Our non-DEC equipment comprises: 64K semiconductor memory system (giving us a total 112K of memory), a dual density (800/1600) 9-track tape drive, model 1600A Versatec printer/plotter, two Photon Pacesetter photocomposition machines, Hendrix OCR-I optical scanner, and sixteen Ontel OP-I programmable intelligent terminals.

We are running under the RSX-11D version 6A operating system. We have designed and written software in MACRO 11 to: drive the PC machine, read and convert TTS coded paper tape, handle OCR output (the OCR is on a DH11 line and stories are automatically spooled to the disk), drive the printer/plotter, down-line load the terminals, and to implement a "newspaper" editing system. In FORTRAN we wrote an assembler for the terminal's code, and we are presently developing a newspaper accounting system.

This computer system is jointly supported by the School of Communication and Texas Student Publications, and the Computation Center provides some pro-gramming support. At present, the primary function of the system is to provide electronic text entry, editing, storage, and typesetting. The system is also used by journalism students in editing classes. Shortly the system will be used to automate the accounting operations of Texas Student Publications.

We would like to expand the text processing capabilities of the system, and here is one area where my interest in UNIX becomes keen. We would like to have text formatting capabilities at the level of NROFF, TROFF, EQN, and NEQN. We are also interested in developing or implementing already existing research systems, like: automatic indexing and morgueing, headline writing, text reading-level analysis, spelling checker, and others. We also are working to implement a link between this system and a CDC 6600 or a DEC 10 system.

If you have read this far, I thank you for reading that long-winded exposition about our system. I hope the foregoing will be helpful to you in formulating answers to my questions by giving a context to these questions.

Is there a UNIX users' group? If so, I would like to join. My mailing address is:
    David M. Phillips
    Computation Center
    The University of Texas
    Austin, Texas 78712

Can you tell me more about the users' group: How old is it? How large is it? How active is it? Are there members in Texas I can contact?

Is UNIX being used in a production environment? In our application reliability is a very high priority concern. How does UNIX rate in reliability and stability?

We did get a license from Bell Laboratories to use UNIX, but we got a copy of the distribution tape from the Health Sciences Center in Dallas. How can we

be sure that this is a current, correct, and complete distribution? In line with that, how can we keep track of new version releases, bug reports and fixes, new software developments, and so on?

It appears that there have been six editions of UNIX since its inception in 1970. Is there an on-going program for support, development, bug fixing, and enhancements to the system? How stable is the system? That is, how often have new versions come and how often are they expected for the future? What is the nature of the changes between editions, or put another way, what kinds of changes in programs are needed to implement new systems? How great are the changes required to switch to a new version?

Do you know of anyone who had developed network communication facilities for UNIX? Can I get a list of user-developed programs that are not part of the standard distribution? Is there some sort of formal program for software interchange?

Do you know if anyone has made the conversion that I contemplate—from RSX-11D to UNIX? What is the DEC corporate feeling about UNIX? Is there any chance of UNIX being subsumed by DEC? What would I get out of the UNIX meeting at the DECUS symposium this May? Who do I contact about documentation? How good is "C" as a system implementation language?

Well, with that last flurry of questions I think I have exhausted my store and probably your patience. I really will appreciate whatever help you can give me, even if only to direct me to some other person(s) for the answers. One final thing, I know it is presumptuous of me, particularly in light of how many questions I asked, but I would like to ask one more favor, and that is for an early reply. I ask this only because we very recently received UNIX and in the next month we need to decide whether to purchase a software support contract from DEC. We are sophisticated programmer types, and ordinarily we maintain our system software ourselves, but we feel the cost or sources for RSX-11D is too great.

Thank you.

Very truly yours,

David M. Phillips

DMP/dm

UNIVERSITY OF ILLINOIS AT CHICAGO CIRCLE
DEPARTMENT OF INFORMATION ENGINEERING
COLLEGE OF ENGINEERING
BOX 4348, CHICAGO, ILLINOIS 60680
TELEPHONE. 996-3423

April 9, 1976

Professor Melvin Ferentz
Physics Department
Brooklyn College of CUNY
Brooklyn, New York 11210

Dear Mel,

A gem has popped out of the woodwork. Please add to your mailing list:

Mr. Pat Fitzhenry
Aviation Research Laboratory
Savoy, Illinois 61874

They are covered by the University of Illinois license. They're running a Cal Data with FIS, and have in desperation rewritten UNIX FORTRAN to use FIS and have eliminated fptrap. They've agreed to distribute through me and I've sent them a tape. They claim that FORTRAN programs that used to run 30 sec under DEC FORTRAN, and about 8 minutes under UNIX FORTRAN, are "back at least on the order of 30 sec". Sounds good, if true.

I'm enclosing the form I've drawn up for the survey. It's long, but complete.

Yours,

Mike O'Brien

MTO: bb
Enc.

ANOTHER BUG FIX

From Dennis Ritchie via Lou Katz (Columbia)

```
/ C library -- reset, setexit

/       reset(x)
/ will generate a "return" from
/ the last call to
/       setexit()
/ by restoring sp, r5
/ and doing a return.
/ The returned value is x; on the original
/ call the returned value is 0.

/ useful for going back to the main loop
/ after a horrible error in a lowlevel
/ routine.
/ From corrected version via DMR of Feb 11,76

.globl  _setexit
.globl  _reset
.globl  csv, cret

_setexit:
        mov     r5,sr5
        mov     (sp),spc
        mov     sp,ssp
        clr     r0
        rts     pc

_reset:
        jsr     r5,csv
        mov     4(r5),r0
1:
        cmp     (r5),sr5
        beq     1f
        mov     (r5),r5
        bne     1b
/ panic -- r2-r4 lost
        mov     ssp,sp
        mov     sr5,r5
        mov     spc,(sp)
        rts     pc
1:
        mov     spc,2(r5)
        jmp     cret

.bss
sr5:    .=.+2
spc:    .=.+2
ssp:    .=.+2
```

5-7

FIRST ANNUAL UNIX POLL AND SURVEY

1. General Information

   Name:

   Organization:

   Mailing Address:

   Phone Number:

   Installation Location:

   Contact Person(s):

   Phone Number(s):

2. Applications:

   Major Application:

   Major Subprojects:

   Future Projects:

3. Hardware

CPU	MEMORY	DISK
Type:	Type:	Type:
Manufacturer:	Size:	Manu.:
Options (f.p., etc):	Manu.:	No.
	Type:	Type:
	Size:	Manu.:
	Manu.:	No.
		Type:
		Manu.:
		No.

How old is your system?

Terminal Interfaces

Type:

No.:

Manufacturer:

Type:

No.:

Manu:

Type:

No.:

Manu.:

Magtapes

Type:

No.:

Manufacturer:

Do you have:

High-speed paper tape?

DEC tape?

Special Interfaces? (Describe)

Have you connected other machines to UNIX?

If so, how?

4. Software

Drivers (other than tty) changed:

Driver:

Changed:

Driver:

Changed:

Driver:

Changed:

Drivers Written:

Changes to:

Scheduler:

Swapper:

tty:

Sys calls added / modified:

Calling #:

Function:

Dependent on other changes?

Calling #:

Function:

Dependent on other changes?

Have you made major modifications to any of the distributed Compilers:

Other programs:

Have you written any major packages of general interest?

Do you need any packages or drivers which others may have written?

Specify six characters to be used as the installation code __ __ __ __ __ __

Return completed form to: Prof. Melvin Ferentz
                               Physics Dept.
                               Brooklyn College of CUNY
                               Brooklyn, New York 11210

Mr. Lewis A. Law
Director of Technical Services
Science Center, Harvard University
1 Oxford Street
Cambridge, MA   02138

    Please have printed the following quantities of manuals for the use of our installation. We are licensed by Western Electric or Bell Telephone for the Sixth Edition of UNIX.

_____ Copies of "UNIX PROGRAMMER'S MANUAL"

_____ Copies of "DOCUMENTS FOR USE WITH THE UNIX TIME SHARING SYSTEM"

Our mailing address is:

        _____
        _____
        _____
        _____
        _____

(Check appropriate lines)

_____ A purchase order is enclosed.

_____ A check for $12.00 per volume is enclosed.
        Please refund the excess if any.

_____ Please send an invoice for the correct amount per volume.

_____ A check will follow.

_____ A purchase order will follow.

(Additional instructions or comments)

_____

signature