Dear Joel:

I have spent some time with the listing you gave me, and I have a number of random comments. Some of them will just be repeats of what I told you the other day, but it is well that all this shit be written down somewhere.

(1) eor should not have character 12(8), print name $EOR$, as its APVAL. Instead, the apval of eor should be character 55(8), print name 55(8), otherwise known as carriage return. This is a slight refinement of the scheme I suggested the other day, which introduced a superfluous APVAL for output EOR, distinct from the perfectly good existing APVAL for input EOR.

(2) We were much too shortsighted in discussing the LISP I/O structure. There should be two user-accessible calls, one each for input and output. These calls will be deviceresetters, with the possibilities DISK, TTYPE, BOFFO. In the DISK case, two additional parameters will specify the file name.

This scheme will unify startread, advance, endread, the disk i/o stuff, pack, print, and so on.

(3) EOF from the disk should not be an error. It should read as $EOF$, if considered as a whole S-expression by itself. If it is encountered while trying to fill out an S-expression, it should give rise to a console message, with the option of going on and having EOF serve as an endless source of rpar.

(4) The present disk error procedure is overelaborate and simultaneously inadequate. After a disk error, the system should type 'disk error' and go into a LISTEN which will exit to redo the call. Most likely, the user will quit out of this LISTEN, save LISP, prnter, diddle with his files, resume, STOP the LISTEN, and thus continue. But the listen might be good for something. In any event, the procedure ought to be a LISP function, so that a user with different ideas about error recovery could (to an extent) substitute them without absolute patching. Let's not get into that bind again.

(5) Also on the disk, we need a user-accessible file-existence test. FSTATE and all that.

(6) What is EXPLODE? I must have missed something.

(7) Flaptraps and dcts should never bomb the system out. There should be a typed message, and the registers should be set to 0 for underflow, 377777777777 for overflow, and so on. If the user wants to take the computation down, that is his business.

(8) Reclalm should have the value list/number of free words; number of full words; depth of pdt_.
(9) As we said the other day, all disk output should be line-marked.
(10) The wall-paper trap should be suppressed.
(11) There should be a permanent object TAB, with apval pointing to character 72(8). That character should have PNAME 72(8).
(12) Lots and lots of supervisor code should be separate LAP pieces. Rather than say 'You users may reassemble LISP any way you want. If you don't want the character-handling routines, take them out, etc.' you should say 'LISP is a supervisor with a large library. The command will have a lot of this library in it, but you can build your own by starting from SOANDSO SAVED, which is little but the supervisor and LOAD.
(13) EOF should serve as STOP to LOAD and to LISP itself.
(14) Given the uniform I/O structure suggested in (2), it should be easy to let the user pick up input in units other than characters or S-expressions, just as the supervisor does with RD.
(15) If an impossible PNAME (too long, illegal characters, whatever) comes in, it should be printed in some manner (octal in some cases), and the user should be asked to type the PNAME which was intended. Number conversion problems fall under this heading.
(16) There was some talk a while back about a new, jazzed-up version of SUBLIS. Is it the one you have?
(17) The pairlist errors ought not to bomb the system. There should be a call to a LISP function which might bomb the system, but which might alternately go into an extended song and dance getting advice from the user.
(18) The same goes for the SPREAD error. Here and there, it will be necessary to call the error-catching function with enough argument information to allow some freedom of choice. For example, the SPREAD error-catcher must certainly have the list (too long) of supposed arguments.
(19) There is all sorts of garbage code around, going back to the tape system. The CH3 error, for example. Also the ERROR1 function, which is the kludge of all time.
(20) There are a number of errors connected with undefined: Functions, go's, arguments, sets and setqs. In all these cases, the system should call a LISP function to type a complaint and go into a LISTEN which will come back to retry the offending operation if it is STOPped. In the case of set and setq, an a-list-extending function should be provided.
(21) How does expt work? If it takes logs, which it probably does, why isn't a log function available to the user? Why can't it take negative things to integral powers? Probably expt hasn't been recoded since the 704; probably it could be significantly jazzed up by stealing a replacement routine from the MAD library.
(22) Unsatisfied conditionals should have value NIL. They should never be errors.
(23) Colon and null characters might be useful. $\text{IL35}$ and $\text{IL57}$ certainly aren't.
(24) Lap errors should chncom in such a way that restart will cause the lap to be retried. Lap errors are almost always file problems, for which LISTEN would be useless.
DEAR BOB,

I have changed the system in the following respects:
1) CR is an atom with 55(8) as an APVAL
2) TYTAB is an atom with 72(8) as an APVAL, which is different from $EDR$ of ADVANCE.
3) PUNCH is in line-marked form, with no atom splitting

With respect to your remarks,
1) You anticipated my kludge wrt $EDR$
2) It would be nice to do that, you overestimate the use of ADVANCE, etc. as far as I know only one person has used it this year.
3) You missed a big kludge in the disk READ program. I never check for an EOF. Maybe I should, but I do not think so. STOP is a very nice device and has caused us no problems so far.
4) Your comment on the disk IO error is really the same. You have made about the other errors.
5) Maybe, I don't think anybody would use it.
6) EXPLODE results in a list of the characters which form the paint value of the S expression given as input.
7) Maybe.
8) Likewise.
9) Done.
10) Maybe, but don't you love the symbol WALLPC.
11) TAB is a function name "CONFUSING.
12) No, no, no.
13)
NO, WELL MAYBE.
14) SOUNDS INTERESTING.
15) "TOO MUCH USER INTERACTION", MAYBE.
16) NO, WE COULD A NEW ONE IN THOUGH.
17) MAYBE.
18) MAYBE.
19) YOU ARE RIGHT, OF COURSE. ON THE OTHER HAND WHY DON'T WE WAIT FOR LISP 2 TO APPEAR ON THE SCENE.
20) I THINK THIS IS BEST OF ALL. I HAVE THOUGHT ABOUT THIS IMPLEMENTATION, BUT HAVE COME TO NO CONCLUSIONS.
21) PROBABLY YOU ARE RIGHT. BUT IS IT WORTH THE EFFORT CONSIDERING ITS LIMITED USE.
22) I AM NOT SURE. I BELIEVE THAT MANY WILL ARGUE YOUR POINT.
23) MAYBE.
24) NO, ERRORS OF THAT SORT ARE SO INFREQUENT [THEY HAVN'T OCCURRED TO ME AS YET AND I AM THE BIGGEST USER OF READLAP] THAT THEY DO NOT PAY OFF IN THE CODE NECESSARY TO GET AROUND THEM.

CONSIDER GETTING SALTZER TO REWRITE EDL FOR US TO GIVE US A PARENTHESES COUNTING COMMAND FOR WHICH WE SPECIFY A STARTING POINT AND RECEIVE THE LINE AT WHICH PARENS COUNT OUT (WRITTEN AS FAR AS THE LAST RIGHT PAREN TO MATCH).

WE ALSO NEED A CHANGE IN PRINT (REALLY RQUEST PRINT) TO PUT IN A BLANK IN COLUMN 1 OF LINE-MARKED FILES WITH SECONDARY NAME LISP. I WOULD RATHER NOT MAKE THE PRINT AND PUNCH Routines PLACE? NOT MAKE THE PUC "NCH" ROUTINE PLACE A BLANK IN COLUMN 1.

JOEL

EDIT
FILE
R 7.166+11.583
Dear Joel,

Runoff dearin for a thrill. In brief,
(1) I have completely reassembled and reorganized LISP, using macros and generally jazzing up the code, using a total of 80,000 words of BBSs.
(2) Some features are altogether new. Not much though.
(3) It hangs on a lack of LISP2 LISP. You bastard.
(4) I have 7-punched it off for track reasons. Keep in touch.

t 99

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t 99
SUUMP FENF1 1701 3
W 1320.6
01701 PZL 000000070437 PZL 000000070436 PZL 000000064424
R 1.083+.466

SAPATCH FENF1 17010* 0 70440 0 70437
W 1322.1
R 1.583+.516

SUUMP 170""""FENF1 1701 3
W 1322.9
01701 PZL 000000070440 PZL 000000070437 PZ 000000064424
R 416+.333

SUUMP FENF1 76651 2
W 1324.3
76651 SAVE NOT FOUND.
R 1.316+.616

SUUMP FENF1 76651 2
W 1324.8
76651 PZL 000000006167 PZL 000000006000
R 1.116+.366

SAPATCH FENF1 17""""76651 0 6166
W 1325.7
R 1.100+.550

SUUMP FENF1 76650 2
W 1326.1
76650 TRA 002000076636 PZL 000000006166
R 1.700+.833

RUNCOM M0SES
W 1326.6
M0SES STARTED
FILE YEAR M0SES NOT FOUND.
INPUT
INPUT YEAR J0EL...
NOW I NOTICE THAT THE VERY FIRST LIN1 OF L1 LISP
IS AN ABSOLUTE PATCH. GOOD GOD. I THOUGHT THAT THE
WHOLE POINT OF THIS EXERCISE WAS TO PUT THEM IN TO THAT
SORT OF CRAP.

BY THE WAY, YOUR PATCH WON'T WORK ON MY SYSTEM,
SINCE I'VE NIPED NILLAC, MOVING LISTNW DOWN TO 00077.
WHY NOT MAKE LISTNW A SYM OR SOMETHING LIKE THAT Q)

EDIT FILE
M0SES HAS BEEN RUN
R 7.550+5.166

WL L1 LISP
W 1331.9
EDIT
C ... 999
Dear Joel:

(1) I looked into getting the disk editor changed to shift Ul files with class name LISP over one column (i.e., no carriage control). My friends are no longer doing the disk editor; you (who are a tech employee, unlike me) should get in touch with Mr. Bjorslett (sn?) at the Comp Ctr. He will likely be able to do it with out much delay.

(2) The name of my little darling is FENNEK. Each of the remaining numbered sections of this memo is devoted to an insert.

(3) IONAC includes the old zl. Three important macros (TSSY, CALLIO, and OPEN) simplify calls to the supervisor, and to the file system in particular. The constant pool has been virtually wiped out, because (a) half the constants in it weren't used for anything, and (b) most constants are now used as literals (the literals live just below_print). The disk error procedure is as follows: The message "DISK ERROR, SAVE AND PRINTER," is printed. Then, LISP goes dormant in such a way that start causes the io call to be retried. After consulting with Martin, I definitively removed the ESTATE from APEND.

(4) IONAC includes NOFILE, a subroutine which gets two arguments (a file-name). NOFILE returns *T* if there is no such file, NIL otherwise.

(5) ZERRRE includes ZELAB. SET is a TRA 1,4. ERD is taken from a SURF ERD.

(6) ZERD is yours.

(7) SETEN includes SAVEZ. TRM is now initialized by SETUP, not by the assembler. ENDQ, END10, ... END16 of SAVE were never used. They are out.

(8) POOL is trivially improved (literals).

(9) TCNIL. The EVAL stuff, EVCDR and EAG11 of EVAL, and PIND of the character routines were never used. They are out.

(10) CONS is yours.

(11) BLOKRE includes RECONZ. NULL.

(12) EQUALZ is yours.

(13) PRINTZ has no WALLPC.

(14) PRINTS is trivially now.

(15) ELOZ is trivially now.

(16) REOI does half the work of leaving 'AFROS' just after the end of a file being read.

(17) GTQZE includes REANX. The rest of that stuff is here, at GETOF, which was unachieved before.

(18) SUBST is trivial. It does not include McCarthy's SUBLIS, which should be collected from Wart.

(19) APEND. NOTS routine is out; the NOT atom runs to NULL. There is now an atom going to REPLAC.
(20) EVNTZE. EVALUATE treats $ERRORS LIKE STOP.
(21) CARXZE is trivial.
(22) ADBLUE includes ADVANC, MKNOZ. ERROR1 is out. All sorts of tape-error shit is out. LOGOR uses to tell the ML that it was LOGOR, and vice versa. That has been fixed.
(23) ARRAY1 is yours.
(24) ELYVAL is yours.
(25) ARAY2 is trivial.
(26) ARTHE is trivial.
(27) EXPER is derived from the FORTRAN library routines. It includes natural-log and e-to-the-x entries. It is fast and short.
(28) ARTHE is trivial.
(29) APPLIE. EVCON returns NIL when it runs out of clauses. I like this, but I will not know if you take it out. At the end of the compiler service section, the literals come in and this insert ends.
(30) ATOM is a radical recoding. All of the present list structure is generated in 8 tracks of EAPF. After three pages of macro-definitions, the property lists of the non-alphabetic objects are laid down at the rate of one card per atom. This includes arranging for each atom that it be on the ODLIST. It is really pretty neat. The macros could have been deleted, but I had one set of supercutting that assembled at about 20 atoms a minute. The present macros are really quite straightforward, and they clean up the code something fierce. There is a separate set of macros for the literals.

There are two new alphabetic APVALS, COLUM and PRIME. There are two new numerical APVALS, ESLEFT and EULSRT. These point into the free-counters of the garbage collector. FILEGEN is a function connected to NOFILE (see (4) above). PILLCH is in. NUMVAL is in for the convenience of LAPPS. LOCSUB takes the natural log of a floating-point number in the AC, and it leaves the result in the AC. It does not operate on LISP objects. Nevertheless, a function taking LISP objects can easily be LAPPed from LOCSUB. EXPSUB is similar, with e-to-the-x.
(31) SYN$ includes ZSETUP. SYN$ is very small, since all that PILL syn -)PILL crap is gone. In SETUP1, I replaced SUB =20 and ADD =1 by SUB =10. This can't be a slopener, can it, one of those hidden-ombreussion jobs? Remember that SETUP sets $TOP.
(32) CUSEUL is yours.
(33) CUSEIL is yours.
(34) LAPZEE. There is some Ia-de-la at the end to make sure that the literals and PUT sequences come out as they should.
Dear Bob,

I have been unable to link to a file with first name FENFEN. Please explain the magic procedure.

There is a bug in the compiler which I fixed before I left. Since I was cramped for space I left LISP2 in temp mode and it disappeared. The LISP2 which is available right now is the old file which was available all along as LISP2P LISP.

The locations 77 and 100 octal are reserved for the compiler. Your comment with respect to them is accurate, but I am not sure the effort is worth it. Is it possible to delete the SYSIND location and all references to it(Q).

I shall try to comment on your points individually.
3) Not bad. It is unfortunate that there are only few cases where another chance will be helpful. Nonetheless this is better than the way I had it.
4) Good.
5) Good.
7) Is there no way to get to the other entrances(Q).
11) No good. I would like to have DECONZ separate so that it can be easily removed.
17) EOF idea is good.
22) You appear to be right about the error. I think the only effect it would have had would have been on a trace or error.
28) Good.
29) All right. I am inclined to agree with you on this score, after all.
30) Excellent. I like the APVALs especially.
31) No, it is not a sleeper. You will find that the system has no constant 19 and I was too lazy to put one in.

I have looked at the error changes, but have not done anything about them. Right now I feel pretty tired of the whole thing and would like to get it to bed. I am willing to make your system into the new MAYBE for a testing period of about a month. If no bugs occur we can finish the memo and make it the new system. I am reluctant to leave the system in its present condition for much longer.

Joel
LISTF, 12/5/65
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3.1334.033
just loaded it? 23.133+.650

save oenotlin t
W 213.0
R 3.350+.716

start 11 4220 5000 24000
W 213.4
6939
VALUE
NIL
VALUE
0
VALUE
NIL
VALUE
NIL
VALUE
DEF1
VALUE
DEFLIST
VALUE

(DEFLIST DEFINE CONC1 CSET PROG2 SELECT2)
VALUE
(CONC CSETQ SELECT)
VALUE
(FLAG TRACE)
VALUE
381
VALUE
(FRRACE DEMFLAG UTRACE OPDEFINE)
VALUE
OPDEFINE
VALUE
NIL
VALUE
((A . 15566Q))
VALUE
((A . 15572Q))
VALUE
((A . 15576Q))
VALUE
((A . 15602Q))
VALUE
((A . 15606Q))
VALUE
((A . 15612Q))
VALUE
((A . 15616Q))
VALUE
((A . 15622Q))
VALUE
((A . 15626Q))
VALUE
((A . 15632Q))
VALUE
((A . 15636Q))
VALUE
((A . 15642Q))
VALUE
((A . 15646Q))
VALUE
((A . 15652Q))
VALUE
((A . 15656Q))
JOEL:

(1) RE LITER: SEE p 154 IN ADDITION TO THE ONES (88, 90, 92, 93, 149) YOU HAVE

(2) RE SUBLIS: ACCORDING TO THE MANUAL, THE CAR'S ON THE ALIST ARE NOT NECESSARILY ATOMS. I THINK THAT MOST PEOPLE HAVE ONLY ATOMS AS CAR's, SO I FAVOR A VERSION OF SUBLIS WHOSE DESIGN FEATURES ARE

   (A) SPEED WHEN CAR's ARE ATOMS
   (B) COMPACTNESS
   (C) SPEED ON NON-ATOMIC CAR's

IN THAT ORDER, TRY

\[ \text{new} \]
\[ \text{sublis} \]
\[ \text{prog} \]
\[ \text{map} \]

\[ g' = \text{gensym} \]
\[ \text{aa} = \text{NIL} \]

\[ \text{new} \]
\[ \text{replace} \]
\[ \text{cons} \]

\[ g = \text{sublis} \]
\[ \text{map} \]

\[ \text{new} \]
SPECIAL ((G, SS))

DEFINE ((

(SUBLIS (LAMBDA (A, S) (PRF H (G, Y, SS)
  (SETQ SS S)
  (SETQ G (GENSYM))
  (MAP A (FUNCTION (LAMBDA (L) (COND
    ( (ATOM (CAAR L)) (RPLACD (CAAR L)
      (CONS G (CONS (CDAR L) (CDAAAR L)))
    )
    ( T (SETQ SS (SUBST (CDAR L) (CAAR L) SS)))))
  )))
(TSET Q Y (SUBLISI SS))
(MAP A (FUNCTION (LAMBDA (L) (AND
    (ATOM (CAAR L)) (RPLACD (CAAR L) (CDDR (CAAR L)))
  )))
(RETURN Y))))
(SUBLISI AS BEFORE )))
UNSPECAL ((G, SS))

(3) Re LITER: THE LI CODE IS

FLAG (((A, B, ..., Z) LITER)
EVAL (((FLAG (LIST PLUSS DASH SLASH STAR EQSIGN ( ) OPCHAR)
  NIL)
(define ((
  (litter (lambda (φ) (and (get φ (quote litter))))))
  (opchar (lambda (φ) (and (get φ (quote opchar))))))
)

Besides litter and opchar, the following subs could be moved back to exprs

(a) search 35
(b) subst tu could use sublis trick to avoid consing
(c) map 73
(d) mapcon 73
(e) remprp 74
(f) attrib 16

F
INSERT $1OMAC$ TSSX, TSSXL, CALLIO, OPEN
INSERT $1OCN$ FILE ROUTINES
INSERT $ZERRF$
INSERT $SETCNF$
INSERT $GCOLEF$
INSERT $STEMLIF$
INSERT $CONSZE$
INSERT $BLCKF2$ → BLCKMY, SEE p 29
INSERT $DECONF$
INSERT $EQUZLZ$
INSERT $PRNTZ$
INSERT $PUNCHF$
INSERT $FLONMF$
INSERT $REDZ1F$
INSERT $GTCDF$
INSERT $SUBSTF$
INSERT $APENDF$
INSERT $EVQTZ$
INSERT $CARZX$
INSERT $ADVIFE$ → ADVIMY, SEE pp 94-96, IF COMP DOESN'T USE LOG, LSHIFT
INSERT $ARAY1F$
INSERT $FIXVLF$
INSERT $ARAY2F$ ARYMAK BSS o
INSERT $ARTH1F$
INSERT $EXPTFE$
INSERT $ARTHMF$ ARTHMY, SEE p 119
INSERT $APPL1F$
INSERT $ATOMS$
INSERT $SYNS$
INSERT $CNSFWF$
INSERT $LAPZFE$