A chutspa.

The concept known as the von Neumann machine has proved to be excep-
tionally stable in the otherwise tempestuous develoent of Computing Science.
In essence, the computers we build and use are still those that were with us
thirty years ago; technology, as it developed, has merely led to a dramatic
increase of capacity, however gradual the steps it has been reached in. This
exceptional stability goes well beyond merely confirming that the von Neumann
concept was not, after all, such a bad idea: its very stability provided a
stable interface between designers of hardware and software, and, for both
groups, the stable interface was an essential prerequisite to progress in
their own fields. Now, to a hardware designer, a von Neumann machine is the
final product; to a software designer, it is no more than a point of departure;
hence, it need cause no surprise that the stability of the interface has ex-
erted rather diverse influences on these several disciplines.

In software, ambitions were raised as increased capacity became available.
Each succeeding project outdid its predecessors by an order of magnitude in
aspiration and complexity. Software designers have been challenged to develop
the mental apparatus --that is, the conceptual machinery and the resultant meth-
ods of design-- imposed by ambition's uncurbed growth. The achievements in this
field, provoked as they may have been by the challenge, while quite spectac-
ular, are still relatively unknown. (That they should be unknown to the public
at large is hardly surprising. Firstly, the subject is of an inherent complex-
ity unfathomable to the uninitiated; taken by itself, this fact would be suf-
ficient to prevent the public appreciating the true magnitude of the undoubted
achievement. Moreover, it is admitted that method has somtimes lagged behind:
each programmer whose reach occasionally exceeded his grasp has added to the
evil repute of software. In fairness, let us also note that programmers have
often been blamed for errors of judgement perpetrated by their managers.)

Hardware designers have been spared the conceptual problems posed by this
proliferation of complexity -- and a good thing too. As it was, hardware de-
signers have been hard put to it to adapt their designs --and re-adapt them
and re-adapt them again and again-- to changing technologies, to economic
parameters in a constant state of flux and to ever-changing material constraints.

I use "hard put to it" advisedly: the difficulties they were in hardly left
them time to put some gloss on their methods of design. When in the audience
of hardware designers discussing their work one can scarcely escape the sus-
picion that Wells's Time Machine exists and is operating: any moderately
competent computing scientist feels violently wrenched back by at least a
decade into the past, possibly by two. To hear them --and this goes even
for the famous-- glitches are still unknown, or at least unrecognized; hazards
are still being prattled about with the very incomprehension that surrounded
them fifteen years ago; the tribe's design methods still suffer from the
craftsman's naïveté. It is hard to decide whether a computing scientist
should be impressed by their technical achievements or appalled by their
methodological backwardness. When confronted with these gentlemen, a computing
scientist may perhaps be forgiven for feeling gripped by an elemental fear of
what is bound to happen when the tribe will start designing chips in earnest:
it has been ineluctable for years now that they will solidify in silicon
each and every type of design misjudgement which the community of computing
scientists has learned to avoid for at least the past decade. Incidentally,
in view of the exorbitant level of chip design costs, this is precisely what
is happening now.....

Let me now show what we are given to read in the Dutch "Report on the
Social Consequences of Micro-Electronics" by an ad hoc advisory committee,
also known, after its chairman, as the Rathenau Committee [their Report,
section 2.5]. To quote verbatim:

"Software problems, we mention in passing, are similar to those met in
designing ICs [as the Indo-European languages are similar to English -- EWD].
Either technique must bridge the gap between standard components and reality.
Yet there is a difference in the degree of standardization; moreover, there
is a difference in the scientific background fitting the respective activities.
A scientific basis for software technology has hardly been established yet;
methods of operation lag far behind those developed in electronics; so does
professional discipline."

Gentle reader, be not incredulous: this piece of pure and unadulterated
chutspa has been quoted as literally as translation will allow. The absence
of competent computing scientists from the Rathenau Committee has wrought the

predictable havoc. One shudders to think about the remainder of the Report's
contents when this sample shows how, in Tennyson's words:

> ".... blind and naked Ignorance
> Delivers brawling judgments, unashamed,
> On all things all day long."

[The above is an English translation of EWD724, which was originally
written in Dutch. I gratefully acknowledge dr.I.S.Herschberg's assistance
in preparing this translation, with which --to tell the honest truth-- neither
of us is fully satisfied. For me --probably more so than for Herschberg,
who has more experience in such matters-- this confrontation with the trans-
lator's problems was an educational experience: it was a lesson in modesty.]

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