

# In Reply to Domains, Relations and Religious Wars

From Hugh Darwen<sup>1</sup>

Dear Editor:

I greatly enjoyed reading R. Camps's article, "Domains, Relations and Religious Wars" in Vol. 25, No. 3, September 1996. The history Camps relates is one well worth relating, and his relating of it accords well with my own recollection.

Camps rightly focuses on certain important facets of the evolution of relational theory since 1969, in particular our ideas about what our revered originator, E.F. Codd, chose to call *domains*. Camps's tone at times suggests that we (in the relational camp) have been guilty of waging war over issues on which we have subsequently recanted, too late. I think this is an exaggeration, and that we could make a reasonable counter-claim to the effect that all of the clarifications we have been able to suggest, after very careful study over those many years, are compatible with what we said before. I would not strongly object if Camps retorted that that, too, is something of an exaggeration, but obviously I think my way of expressing it is closer to the truth.

Here are some of the changes of mind or clarifications (let the reader decide!) that we might confess to or take pride in, whichever is appropriate (I repeat: let the reader decide):

1. We thought there was such a thing as absolute atomicity, of domains, such that some domains should be proscribed. Then we realised that this conflicted with the orthogonality we had always propounded, of domains with respect to relations. We tried to clarify atomicity as a relative concept, just as it is in physics and chemistry. Like physicists and chemists, we like to stay at our chosen level of abstraction. The domains we originally condoned are still available.
2. We thought primary keys were desperately important, a *sine qua non*, even though the evidence was staring us in the face that they are of mere psycho-

logical importance. *Candidate key* is the logically important concept, we now say.

3. We discovered that there were some holes in the original work on normal forms. Yet, although second and third normal form were shown to be inadequate for guaranteed avoidance of update anomalies, those terms are still being taught, because the further normal forms were all pure additions to the theory.
4. We came to regret the abstruse term "domain", when we realised that it meant exactly the same as "(data) type" and "(object) class".
5. Although we knew at the outset that the Relational Model of Data was not really a model at all, but rather a *theory*, we didn't think the infelicity would do any harm, so we kept reasonably quiet about it. In retrospect, we might regret that silence (just a little).

Regarding point 1, Camps's "Final Comments" include this: "The discourse on atomicity and 1NF was often a fundamentalist discourse, strongly opposing the complex columns in pre-relational systems. This battle was part of the first database war. At least, this was the losers' understanding, and that of general people, who, in their vast majority, reluctantly accepted the dictates of *The Law*." Here I really must protest. First, I claim that the "general people" Camps refers to were, in fact, special people (namely, computer programmers, though not all computer programmers were reluctant). Much more importantly, though, there *were* no "complex columns" in pre-relational systems, precisely because there were **no columns!** This—the requirement that all information be represented by values in columns and in no other way—was the issue over which the war was waged. I agree that we were simultaneously propounding a notion of atomicity that we now think was ill-conceived, but, above all, we were pleading for the database and its query results to comprise *nothing but relations* (in the case of the database, Date and I now say "relation variables", or "relvars" for short). Had this battle not been won by the relational camp and lost by the losers, our databases would have continued to have the mishmash

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of structures coexisting at the user interface that had militated against ad hoc query, declarative constraints and all the Good Things that the object oriented database purveyors are at last discovering they have lost, in their opposing aim of making databases look like the variable declaration sections of computer programs. Happily, this time around it looks as if a rapprochement is there for the grasping. Date and I have offered our contribution towards this rapprochement, now being actively pursued by a large section of the database community.

Finally, my eye caught the words of Michael Stonebraker (1988), quoted by Camps under the title of the article: "data models have much in common with religion". I wonder if Stonebraker would have come to say that, if Codd had used the word "theory" instead of "model".

Sincerely,

Hugh Darwen (10th October 1996, Warwick, England)