David Makinson

IN MEMORIAM
CARLOS EDUARDO ALCHOURRÓN

I

An outstanding figure at the meeting point of philosophy, logic and law, Carlos Alchourrón died on the thirteenth of January 1996 in Buenos Aires. Carlos was known personally to many at the University of Oslo, where he was Visiting Professor in late 1993 and early 1994, as well as to a number of other Scandinavian philosophers. He is also known to many more across the world through his writings—indeed, to all those active in any of the three areas of the philosophy of law, the logic of norms, or the logic of belief change.

As a student, Carlos took a degree in law in 1957 at the University of Buenos Aires, but never exercised the qualification. Against the wishes of his family, he followed his passionate interest in theoretical questions, completing a doctoral thesis, also at the University of Buenos Aires, in 1967. Its title, "Logical clarification of some juridical concepts", indicated what was to be the central preoccupation of his research in the years to come, and his fascination with clarity and precision in matters where others were content with less.

In those early years Hans Kelsen was an important influence on Carlos in the philosophy of law. In the logic of norms and action an even more decisive influence was Georg Henrik von Wright, whom Carlos met for the first time in 1968 when he was giving some lectures in Buenos Aires. Although they do not seem to have published any work jointly, a number of their papers read like an extended dialogue in which their initially differing viewpoints come closer together.

Many of Carlos' papers in the philosophy of law, and some on the logic of norms, were written jointly with his friend and colleague Eugenio Bulygin, and as joint authors of the widely read book

Normative Systems of 1971 they became known as a tandem. Indeed, it was a jest that a generation of students in Buenos Aires grew up under the illusion that the author of the Spanish version of the book, published in 1975 under the title *Introducción a la Metodología de las Ciencias Jurídicas*, was a certain Alchourrón-Bulygin. The papers that Carlos and Eugenio wrote separately and in collaboration up to 1990 have been collected and published, with an introductory overview and also a valuable prologue by von Wright, in Spanish in 1991 under the title *Análisis Lógico y Derecho*.

In the late 1970's, Carlos began a close collaboration with David Makinson on the fine logical structure of derogation in legal codes, which soon expanded into a more general investigation of the logic of the contraction and revision of theories (or, more briefly, the logic of theory change, *alias* belief change). Together with Peter Gärdenfors, they wrote over a period of three years the *locus classicus* of the field "On the logic of theory change: partial meet contraction and revision functions", *Journal of Symbolic Logic* 50 (1985) 510–530. The trio of authors and their paper later became known colloquially as AGM, and the approach there developed to the logic of belief change as the "AGM paradigm".

For many years Professor of the Philosophy of Law at the Faculty of Law at the University of Buenos Aires, Carlos also became Professor of Logic in the Faculty of Philosophy and Letters. In 1975 he was awarded a fellowship of the Guggenheim Foundation, and in 1984 he was elected a member of the Institut International de Philosophie. In his last years Carlos was the guiding light of an active and dedicated seminar of staff and graduate students from the departments of Philosophy and Computation, meeting alternately in the two locales miles apart. His death has left a gap among them that is perhaps difficult to appreciate in Europe, and it is hoped that his students will find some way, inside or outside Argentina, to continue what they have begun with such promise.

II

Carlos Alchourrón's work is extensive and wide-ranging, and there is no possibility of summarizing it here. But two principal threads stand out, in which he was a pioneer.

One is the distinction between norms themselves, understood as acts attributing obligations, permissions, interdictions, powers, etc., and what for the lack of a better name Carlos called "normative propositions", which are statements about such norms, for example in which

they are declared to be part of given legal codes or moral outlooks. The distinction is of course not a new one, but there has been a tendency to make it rather vaguely, and then to go on as if it had no significant consequences. Carlos and Eugenio took it seriously, coming to the conclusion that its neglect leads to endless confusion in deontic logic. For example, internal permission, which occurs as a norm in a system, is easily conflated with strong and weak external permission, which both occur as descriptions of normative systems. The confusion affects not only logic but also the philosophy of norms and in particular of law. For example, in discussions of "gaps" in legal codes, the so-called "principle of permission" (that whatever is not prohibited is permitted) may function either as a norm within a system, or as a normative proposition about a system, with quite different status—in the former role, for instance, it is not equivalent to its contrapositive, that whatever is not permitted is prohibited, whilst in the latter role it admits of at least two interpretations, one of which would be a tautology. For these reasons, Carlos was convinced of the need to construct two quite different deontic logics for the two contexts, and indeed was the first to do so in his 1969 paper "Logic of norms and logic of normative propositions". It is unfortunate that this pioneering paper was published in a relatively little-read journal, giving it much less impact than it deserved.

The distinction also brought with it a deep philosophical problem with which Carlos wrestled throughout his life. Whilst "normative propositions" may have more or less determinate truth values, norms themselves are items of another kind. They may be applied or not, obeyed or not, and may also be subjected to evaluation from the standpoint of one's own normative commitments; but it makes no apparent sense to describe them as true or false. But if this is the case, then as Dubislav and Jørgensen observed in the 1930s it is not clear what could be meant by applying the truth-functional connectives "and", "or" and, most spectacularly, "not" to norms; and, if that is so, then in turn it is not clear how logical consequence might be defined between norms and what in general a logic of norms should really look like. Three ways out suggest themselves—that, after all, norms do bear truth values; that they do not, but nevertheless for the purposes of logic can be treated as if they did and thus subjected to truth-functional connectives and placed in a logic that includes the classical one; finally, that they do not bear truth values and cannot be treated as if they did. True to his deep convictions Carlos always regarded the first of these paths as philosophically indefensible, and in his papers he hesitated between the apparent nihilism of the third and the apparent lack of principle in the

second one. In a paper "Logic without truth" written in collaboration with A. A. Martino and published in 1990, he sought to give a definition of logical consequence that, unlike the usual Tarski definition, makes no reference to truth or falsity. However, in most of his papers on the logic of norms he follows the second path, although in full awareness (unlike many deontic logicians) of its problematic nature.

A second pioneering thread in Carlos' work, which has left a deep mark, is his fascination with the concept of derogation. In the philosophy of law, this notion had for long been regarded as unproblematic: one simply removes a norm from a corpus to form a new and smaller corpus, just as one may add a norm to the corpus to form a new and larger one. But, as noted *en passant* by Cornides in 1969, there is evidently an asymmetry between the two. The result of promulgating a norm is in principle determinate: the new corpus consists of just the old one plus the new norm. But the result of a derogation may be indeterminate, for two main reasons. First, the norm to be derogated may not be one of the norms explicitly listed in the corpus, but merely a consequence of them; several of the explicitly listed norms may jointly give rise to that consequence, and the question arises which among them should be removed to avoid it. Second, even if the norm to be derogated is one of those explicitly listed in the corpus, it may turn out to be implied by the remainder. This gives rise to two kinds of derogation: a weak one in which we just strike out the norm from the list, but continue to accept it as a consequence of what is left, and a stronger one in which we contract to a subset that no longer implies the norm in question. Evidently, there can in general be many such subsets, and indeed many maximal ones. Derogation is indeterminate in so far as it does not make provision for choice between them.

This problem began to preoccupy Carlos and his colleague Eugenio Bulygin early in the seventies. I remember that when Carlos mentioned it to me, as requiring some kind of formal analysis, I was at first quite unprepared to respond actively. I felt that the indeterminacy of derogation was just an unfortunate fact of life, and that whilst a successful derogation should indeed choose between the possibilities left open, this would have to be done on substantive grounds about which formal logic could say little or nothing. Carlos and Eugenio formulated and advertised the problem in a paper presented at a conference in Bielefeld in 1975 (published in German and Italian in 1977, and in a revised form in Spanish in 1976). The key to a formal treatment came to us towards the end of the decade. Stated in its final form, it is as follows: if A is a set of norms and x is the norm to be derogated from it, work with the set $A \perp x$ of all maximal subsets of A that fail to imply x, together

with a selection function or a relation over $A \perp x$ that permits choosing a "best" element of $A \perp x$ or at least serves to mitigate its multiplicity; define the result of the derogation as the element thus chosen, or as their intersection if there are more than one.

This conception began to move towards the light of day in our joint paper "Hierarchies of regulations and their logic" in 1981, which can be seen as groping painfully towards ideas that would later become formulated as maxichoice contraction and safe contraction. Just as the paper was about to be sent for publication, we noticed that both the problem and our line of attack were much more general than we had imagined. Nothing in the approach required that A actually be a system of norms. It could be chosen to be an arbitrary set of statements, with the problem becoming the general one of eliminating an unwanted component or consequence of a theory. We came into contact with Peter Gärdenfors, who had entered the same area from quite a different direction—his quest for a foundation for the logic of conditionals that would be free of the alleged ontological commitments of the existing one in terms of "possible worlds". In papers published over the period 1978 to 1982, Peter had managed to formulate a number of syntactic postulates or conditions for revision and contraction. Carlos and I, in our 1982 paper "On the logic of theory change: contraction functions and their associated revision functions" saw that these postulates would be satisfied by taking belief contraction simply as the result of selection of a single element of $A \perp x$, a process later dubbed maxichoice contraction. This paper was published in *Theoria*, a journal then edited by Peter, and the three of us then joined forces, generalizing from maxichoice to partial meet contraction/revision functions and proving appropriate representation theorems in intensive correspondence between 1982 and 1985. Despite the difference in trajectories, the collaboration was a dream. Carlos and I, coming to the subject via derogation from normative systems, tended to see contraction as basic, with revision a byproduct defined by the Levi identity; we also saw the application of these operations directly to theories already closed under logical consequence as a fascinating and instructive mathematical exercise, whereas in the real world they unfortunately have to be applied to bases for theories, with less elegant properties ensuing. Peter, coming to belief change in his search for a foundation for the logic of conditionals, tended to see revision as more important, with contraction as a preliminary or as an outcome via the Harper identity; he also tended to regard the application of these operations directly to closed theories as a serious option in practice. But these philosophical differences stimulated rather than hindered our formal work. Those were the days before email, and col-

laboration was carried out by means of letters circulating incessantly between Buenos Aires, Lund, Beirut and Paris. Thus appeared the paper AGM mentioned above, in 1985. Although the authors met in twos from time to time, there was only one occasion on which the three came together, at a workshop on belief revision held in Konstanz rather later in October 1989.

A digression: some people have told me that when AGM first appeared they had considerable trouble understanding it, despite their backgrounds in logic. Today that is no longer the case. I have often wondered why, and speculate as follows. Logicians working in propositional logic had, up to that time, focussed almost exclusively on logical "calculi"—systems of logic understood as sets T of formulae, or inference relations $\vdash$ between formulae, that are structural in the sense of being closed under substitution of arbitrary formulae for elementary letters: if $x \in T$ then $\sigma(x) \in T$, and if $A \vdash x$ then $\sigma(A) \vdash \sigma(x)$ for every substitution function σ. Attention was also focussed on just a few "correct" or distinguished choices of T and of $\vdash$, such as classical, intuitionistic, or relevantist. There is nothing like this in belief contraction or revision. Closure under substitution plays no role; nor does AGM study any specific distinguished belief revision function but rather whole families of functions that satisfy certain syntactic conditions or can be generated in certain ways. The same phenomenon perhaps explains some of the common difficulties of adjustment to ideas of nonmonotonic logic. The inference relations $\vDash$ there studied are typically not closed under substitution, and the focus is not on the study of any single or few distinguished relations (although this is attempted by those working on circumscription) but rather large families of kinds of relation, and procedures for the construction of such families.

Carlos' work on formal aspects of theory change continued beyond the AGM paper. Together, we formulated the concept and basic theory of "safe contraction". The idea is simple and appealing. Given a set A of statements with an acyclic relation $<$ over A, and a statement x that we wish to remove, an element $a \in A$ is said to be "safe" with respect to x iff it is not a minimal element (under $<$) of any subset of A minimal (under $\subseteq$) among those that imply x. The safe contraction $A - x$ is then defined as $A \cap \mathrm{Cn}(\{a \in A : a \text{ is safe with respect to } x\})$. Although very different in direction of approach, this concept yields essentially the same results as partial meet contraction (as proven by Alchourrón and Makinson, with further results later by Hans Rott), including in particular satisfaction of the curious "recovery" postulate. Safe contraction has never had as much notoriety as either partial meet contraction or the Gärdenfors-Makinson contraction based on epistemic

entrenchment. Nevertheless, both Carlos and I have always been fond of it. Its lack of public success compared to AGM may be due in part to its place of publication (the Polish journal *Studia Logica*, undeservedly little read in the USA, as contrasted with *The Journal of Symbolic Logic*); compared to contraction via epistemic entrenchment it may be due to the kind of readership (mainly grantless logician philosophers in the case of *Studia Logica* as contrasted with well-funded computer scientists in the case of *Proceedings of the Second Conference on Theoretical Aspects of Reasoning about Knowledge*). Or, perhaps, our favorite baby is just less attractive.

Curiously, despite the correspondence between belief revision and nonmonotonic inference (under the equivalence $a \mathrel{\vdash_K} x$ iff $x \in K * a$), Carlos never worked actively in the latter area and indeed did not have much sympathy for it, feeling that it was a misleading way of going about things. The reason for this reticence perhaps lies in his deep belief in the importance of deductive formal logic as a basic methodological tool for philosophical analysis in general and for the study of systems of norms in particular. His position, expressed for example in the essay "Logic and the limits of legal reasoning" (1989) is that nonmonotonic or default inference $A \mathrel{\vdash} x$ may usually be seen as enthymatic deductive inference $A \wedge A' \vdash x$, and once the additional premises A' are made explicit, ordinary deductive logic is sufficient for its evaluation. This is one of the few points on which Carlos and I were not able to agree entirely. His position appears to me defensive of classical logic where defense is not needed. Nonmonotonic logic is not some kind of rival to monotonic deductive logic, but an outgrowth from it. Whilst inferences by default can indeed be reduced in the way indicated (indeed, by the trivial expedient of putting $A' = \{y : A \mathrel{\vdash} y\}$, provided the relation $\mathrel{\vdash}$ satisfies a few natural conditions), this does not detract from their significance, nor from the interest of the various kinds of construction that have been devised (e.g. Poole systems, which are basically maxichoice constructions, preferential models, plausibility valuations, Reiter style default systems, etc.) to generate them.

There was one other point on which Carlos was working at the time of his death, which we often discussed but on which we were unable to agree fully. Carlos felt that there is something fundamentally incoherent about those conditional logics which, like the Stalnaker-Lewis logic of counterfactuals, reject the principle of strengthening the antecedent (*alias* monotony) but accept modus ponens, i.e. reject as thesis the formula $(a > x) \rightarrow ((a \wedge a') > x)$ but accept the formula $(a \wedge (a > x)) \rightarrow x$, where $\rightarrow$ is truth-functional implication and $>$ is the conditional connective. His views are sketched in the paper

"Detachment and defeasibility in deontic logic", presented at a workshop in Oslo in January 1994 and to appear shortly with other papers from that meeting in *Studia Logica*. They were also being developed in a book entitled *An Essay in Defeasible Logic*—a title evidently intended to recall two volumes of his mentor von Wright, on modal logic and on deontic logic—that Carlos began planning in 1994, but which was not completed, due to the advance of the illness that finally carried him away.

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