

A BRIEF HISTORY OF SOCIAL CHOICE

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Some fundamental elements

- 1 According to McLean and Urken (1995) "**Social Choice** is the study of of all procedures for **producing group decision from individual preferences**".
- 2 The **past is rich** and we brought **several concepts** to modern Social Choice.
- 3 **Borda count, Condorcet method, . . .**

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2. The “Pioneers”

2.1. Jean-Charles, chevalier de Borda (1733 - 1799)

Short Biography

- 1 Background:** French mathematician, physicist, political scientist, and sailor.
- 2 Living places:** Dax (born), Paris, Mézière, Bordeaux, crosses the Atlantic several times, ...
- 3 Interested in:** Ballistic, fluid mechanics, hydrography and cartography, Chairman of the Commission of Weights and Measures (**measurement theory: meters, kg, etc.**), **Elections**, ...
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New concepts: **The Borda Count**

- 1 Criticized the Condorcet method:** not workable in practice and no winner might occur.
- 2 Proposed a new method:** ranking candidates by giving each the points corresponding to their ranks. The voters give the candidate they favored least one point, the next candidate two points, and so on. The winner is the candidate who got more points, after making the summation of the points attributed to each candidate by each voter.
- 3 Scoring technique:** also used in **multiple criteria decision analysis.**

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- 3 Interested in:** Calculus (Integral), Inspector General of the Mint, Secretary of the Académie des Sciences, probability and the philosophy of mathematics, **Elections**, . . .

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Source: commons.wikimedia.org/wiki/File:Condorcet-NB.jpg



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- 2 Essai sur la constitution et les fonctions des assemblées provinciales (1788).
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New concepts: The Condorcet method

- 1 Condorcet method:** It's a **pairwise election** method where ranked ballots are used to simulate many head-to-head elections. The winner of a Condorcet election is the candidate who wins all pairwise matchups (robla.net/1996/politics/condorcet.html).
- 2** Condorcet was aware of his **Paradox of voting**.
- 3** Several methods can be used to **solve this drawback**: graph “kernel” in ELECTRE methods for choice problem statements (B. Roy, 1985).

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2 **Living places:** Geneva, Poland, ...

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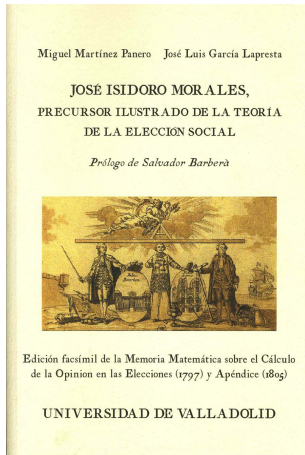
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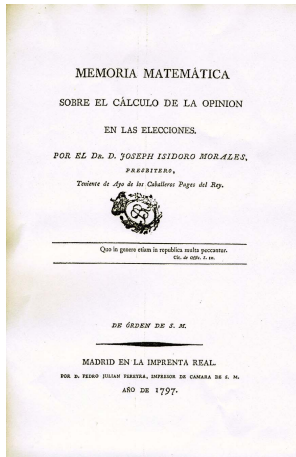
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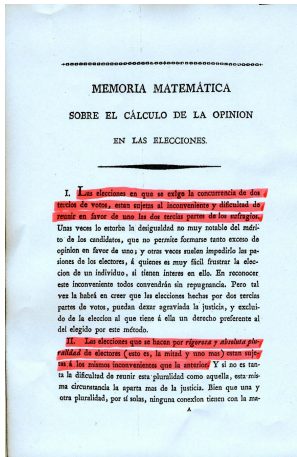
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Source: Wikipedia



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- 2 Borda could violate the **independence w.r.t. irrelevant alternatives**.
- 3 Only unanimity would guarantee that a majority winner is also a Borda winner (**pervasive implication**).
- 4 Demonstrated that a **Borda loser cannot be a Condorcet winner**.

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Short Biography

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Source: richardwiseman.wordpress.com/.../



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- 1 The **Principles** of Parliamentary Representation (1884). (PR.)
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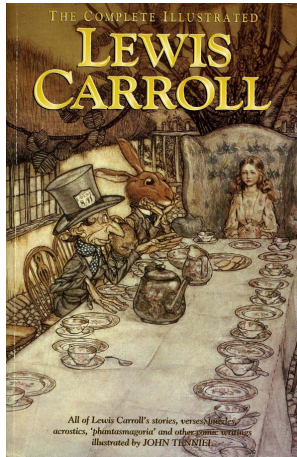
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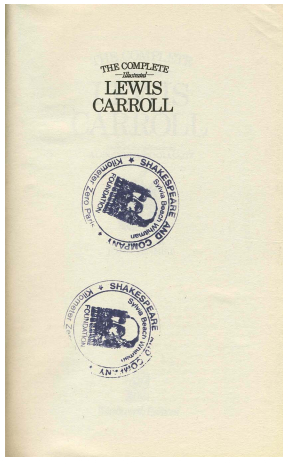
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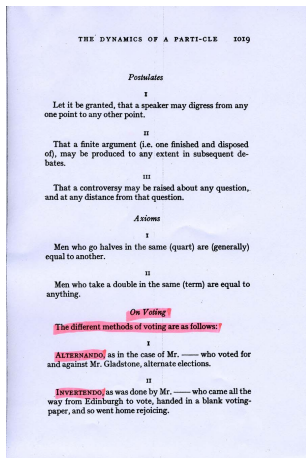
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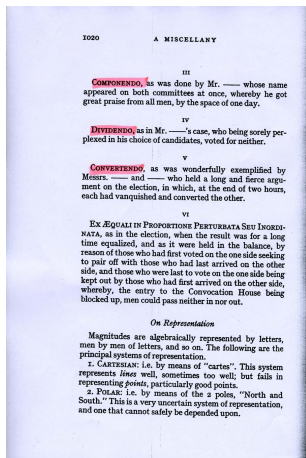
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Source: Wikipedia



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- 1 E.J. Nanson (1882). **Methods of Elections**. Paper read to the Royal Society of Victoria on 12th October 1882.

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- 1 E.J. Nanson (1882). **Methods of Elections**. Paper read to the Royal Society of Victoria on 12th October 1882.

4. The Nineteenth Century

4.2. Edward John Nanson (1850 - 1936)

New concepts: **Some**

- 1 Nanson's method **removes those choices** of a certain margin (from the Borda score) that are equal or below the average score of Borda count method. Then, the **ballots are re-labeled** as if the remaining candidates were exclusively in the ballots. This **process is repeated**, if necessary, until the only **winner is found**.
- 2 Showed that several methods are **not Condorcet efficient** (they can reject a Condorcet winner).
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Short Biography

1 Background: German cardinal of the Catholic Church from Germany (Holy Roman Empire), philosopher, jurist, mathematician, astronomer,

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Source: Wikipedia



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1 N. Von Kues. **De Concordantia Catholica** (1431).

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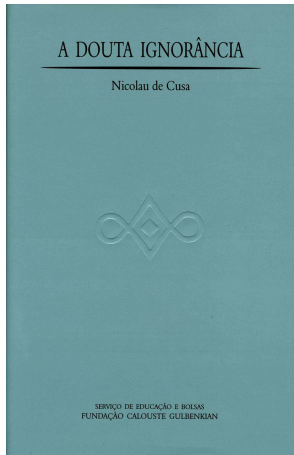
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New concepts: **Some interesting ones**

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Short Biography

- 1 Background:** Spanish (Catalan) mystic, poet, and missionary (crusader).
- 2 Living places:** born 1232/33, in Ciutat de Majorca, died 1315/16, Tunis or near Majorca, traveled widely, ...
- 3 Interested in:** Convert Muslims and Jews to the Catholic Church, **Elections most related to cleric people**, ...

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- 2 **De Arte Eleccionis** (1299).

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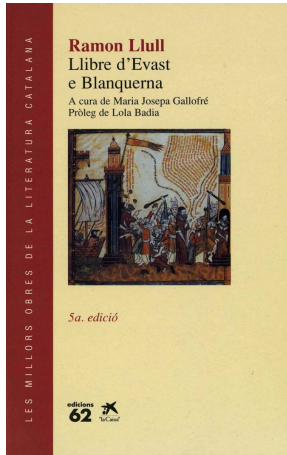
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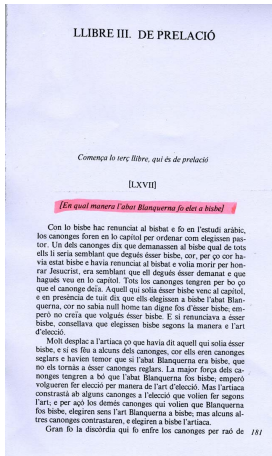
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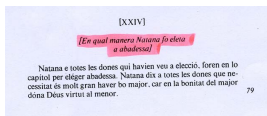
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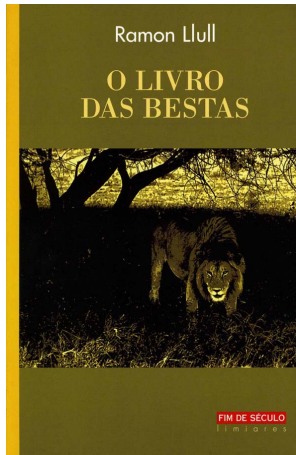
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New concepts: **Very interesting ones** (1)

- 1** Proposed **two election methods**. Both apply the principle of selecting **pairs of objects from a larger set**.
- 2** Consider 36 compartments or cells and represent the 36 combinations of 2 candidates from a set of 9. In his **exhaustive pairwise comparison method**, “the winner should be is the one with the most votes in the most compartments”.
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Conclusions

New concepts: **Very interesting ones** (2)

- 1 If we consider that "in the most compartments" is **redundant**, then it corresponds to the **Borda count**.
Assign 0 points for the last place,
- 2 Otherwise, it leads to the **Copeland winner**.
- 3 In De Arte Eleccionis, R. Llull recommended a **Condorcet procedure**.

5. What happened before?

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Conclusions

Short Biography

- 1 Background:** Lawyer, author, magistrate of Ancient Rome,
- 2 Living places:** Rome, Pompeia, Syria, . . .
- 3 Interested in:** Writing especially some interesting letters that are in the book.

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Source:

www.moser-pennyroyal.com/.../Ashen_Sky.html



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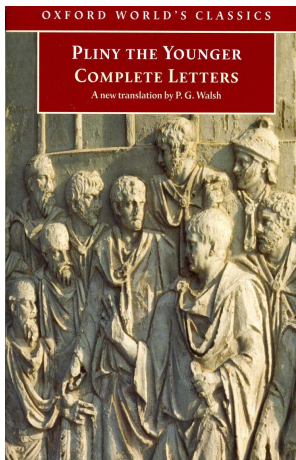
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- 1 As you are the greatest expert on private and public law, a part of which is concerned with senatorial procedure, I am extremely keen to have your views on whether I acted wrongly or otherwise in the Senate the other day. My aim is to seek enlightenment not on what is past—it is too late for that—but for the future, in case something
- 2 similar occurs. You will respond: 'Why do you enquire about something which you ought to have known?' My answer is that the slavish situation of former days casts a kind of forgetfulness and ignorance over senatorial procedures* as over other most honourable pursuits,

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for how few of us have the patience to wish to learn what we shall not
apply in practice? Then too it is difficult to retain what you have
learnt unless you practise it. So the resumption of freedom has
found us ill-educated and ignorant, but, fired by the sweetness of
that freedom, we are compelled to perform certain duties before we
are acquainted with them.

In days of old the custom was that, not merely by listening, but
also by observing, we used to learn from our elders the procedures
which we were next to follow, and then in our turn we were to pass
them on to the younger generation. Thereafter our young men were
then lent immediate experience in periods of military service, so that
they grew accustomed to command by obedience, to exercise leader-
ship by following others. Then before becoming candidates for
office, they would stand at the doors of the Senate House* to observe
state policy before sharing responsibility for it. Each individual had
his father as his teacher; the greatest and the oldest men in the state
took on parental duties for those who were fatherless. Thus men
were instructed by example (the most reliable means of attaining
knowledge) about the powers of proposers, the rights of voters, the
discretion of magistrates, and the freedom of the rest. They also
learned when they should yield and when they should hold out, the
time for silence and time limits for speaking, the distinction between
competing proposals, the way of introducing supplements to existing
motions—in short, the entire conventions of senatorial procedure.

Admittedly, when we were young men, we performed military
service, but at that time military excellence was under suspicion,
sluggishness was rewarded, leaders had no authority, and common
soldiers showed no deference. Authority was nowhere in evidence,
nor obedience either, for the whole scene was lax, disorganized, and
topsy-turvy. In a word, all was better forgotten than remembered.

We then trained our gaze on the Senate, but a Senate which was
fearful and speechless, for it was dangerous to express your convictions,
and humiliating to repress them. What was it possible to learn
at that time, or what point was there in having learnt such things,
when the Senate was summoned to be wholly idle or wholly wicked,
when it was kept in being to be now a laughing-stock and now ripe
for grief? Once we became senators, for many years we witnessed
and endured the same evils in which we then took part, so that our
talents were blunted, broken, and bruised by them, affecting even

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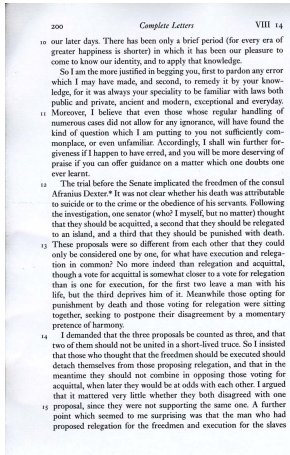
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had been compelled to subdivide his proposal, whereas the proposer of death for the freedmen was being counted in with the advocate of relegation. For if it had been necessary for the subdivision of one because he was combining two issues, I did not see how the proposals of two such different submissions could be combined.

So let me now render an account of my understanding of the situation to you as if you had been there, and though the case is terminated, as though it were still undecided; let me now assemble at leisure the points I then made intermittently in the face of many loud protests. Let us imagine that three judges only had been assigned to this case, and that the first of them had decided that the freedmen should be executed, the second that they should be relegated, and the third that they should be acquitted. Will the first two judgements combine forces and eliminate the third, or will each of the three separately have the same validity as each of the others, so that the first cannot be joined to the second any more than the second to the third? So in the Senate likewise, the proposals advanced as different ought to be accounted differently. But if the one identical person submitted that the freedmen should be both executed and relegated, they would surely not suffer both death and relegation on the basis of a single judgement. In short, a judgement combining such diverse punishments could surely not be considered a single one. So when one person proposes that they be executed and another that they be relegated, how can this be seen as a single judgement advanced by two persons, when it did not appear as one advanced by one person?

Again, does not the law^o clearly teach that proposals for execution and for relegation must be distinguished from each other, when it prescribes a division in these words: 'You who make this judgement proceed to this side, and you who support all other measures proceed to the side which you approve?' Scrutinize and weigh each word. 'You who make this judgement', that is, you who believe that they are to be relegated, 'proceed to this side', that is, to the side where the proposer of relegation is seated. This makes it clear that those who believe that they should be executed cannot remain at that side. 'You who support all other measures': note that the law was not content to say 'other measures', but added 'all'. So there is surely no doubt that those who opt for execution take a wholly different view from those who support relegation. 'Proceed to the side you

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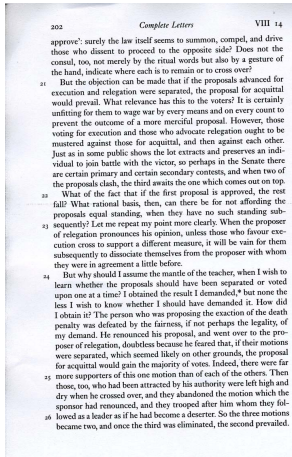
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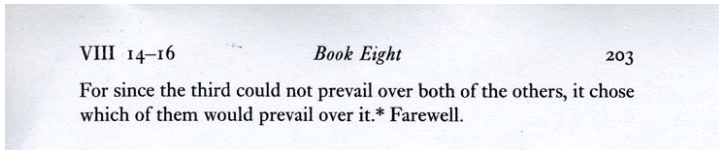
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New concepts: *A few, but important*

- 1 Letter to Titius Aristo. Three options for the slaves: (1) immediate execution; (2) banishment, and a third one.
- 2 At the Senate Pliny proposed the following rule: “*voters to go to as many sides of the room as there were options under discussion*”.
- 3 If the opinion was *one-dimensional*, he shows that the banishment was the *Condorcet winner* among the three options.

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