ORIGIN OF ZERO

'Zero'- the last major invention in the history of numbers is the result of a long and slow evolution. Unfortunately we do not have precise evidence of 'zero origin' and in most occasions we rely on assumptions based on Archaeology and historical events.
 It all started with the introduction of numbers, probably because of practical needs: how many days, goods, animals, children, etc.
The first written numbering system in record history it's from the fourth millennium BCE in Elam (Iran today), but the first evidence for zero is from the Sumerians in Mesopotamia (5000 years ago). It wasn't a notation, just a space used as a place holder for empty columns in the '*cuneiform*' writing (wedge-shaped marks in soft clay). [1][3]

        The first evidence of an actual sign for zero (   ) comes from "*Mathematical Tablet from Uruk*" (present at Louvre Museum), dated from the Seleucid Period, late third/early second century BC. But 'zero' does not seem to have been imagined as nothing, just positional because in a text referring to distribution of grains the scribe writes that "*the grain is finished*" instead of zero.[1-p152]

        When the Spaniards conquered Central America (the sixteenth century) the Maya(pre-Columbian culture) was extinct for several generations and unfortunately most of the remains from this culture were destroyed in the attempt to Christianize and also to destroy the evidence of the Aztecs bloodthirstiness.
The Maya possessed a true zero that was related to religion and aesthetic ideas (Gods were caring the time-units[1][2]), represented by a sign resembling to a snail-shell (   ) ("*The Dresden Codex*"- kept in Germany- one of the only three ancient Maya manuscripts that escaped from the conquistadors).[1-p310]

        In China we find the first appearance of 'zero' is in a mathematic problem of "*Old Man of JiangXian*" (where the space left for zero creates problems in finding his age). But only since the eight century CE did the Chinese begin to introduce a special positional sign ( ) for commercial purposes and it's believed that 'zero' reached them through the Indian influence.[1]

        India's positional system is 'mother of modern system'. The initial sign for zero was a dot   called "*sunya*" and later as   on the "*Manuscript from Beksali*" (Pakistan today) dated between the ninth and twelfth century CE written in '*Sanscrit*' language[1]. From the sixth century onwards ('*Gupta's Dynasty*') the use of zero begins to appear frequently in documents from India and S-E Asia. It is believed that from now it took place the invention of zero and it's operational potential (well established on Brahmagupta's book, written in 628, where positive numbers=fortune, negative=debts and zero is "*sunya*" (void, empty) or "*kha*"(nothing).[5]

ORIGIN OF ZERO

From here 'zero' migrated to Arab lands where the first important mathematician to make use of his positional relation was Muhammmad ibn Al-Khwarizmi(783-850) who made significant contributions to the popularisation of Indian numerals(incl. zero), calculation methods, algebra("*Al Jabr*") and algorithms ("*Al-Khwarizmi*").[1][3]

The Romans's and the Greeks's 'additional system' was incompatible with the Hindu-Arab 'positional system' so 'zero' penetrated after long time, because their intention was to impose religion and culture to the "*infidels*" of the Middle East.[1]
The change was a long process, amongst the figures that had a significant contribution is Leonardo Fibonacci (of Pisa), an Italian mathematician that travelled to Near East and to North Africa (his father being a public scribe). Fibonacci wrote a book called "*Liber Abaci*"(Book of Abacus) and the first chapter opens with: "*These are nine figure of the Indians: 9 8 7 6 5 4 3 2 1 . With these nine figures and with this sign* **o** *which in arabic is called zephirum, any number can be written*" [3-p71][4- p 102-108]

The Renaissance was a very prolific period and still at that time the status of zero represents "*a source of confusion*" as we can read in the manuscript: "*Triparty en la Science des nombres*" by Nicolas Chuquet (1484): "*the tenth (*ref to 0*)does not have or signify a value, and it is called cipher or nothing or figure of no value*"[4-chapt 6]
The main question in the fifteenth century was 'Zero- nothing or something'. The French writers called zero " a *figure causing confusion and difficulty*", because it is usually regarded as nothing(3+0=3), but sometimes is something: 40000- the string of nothingness multiplies the 4 ten thousand times.[2]
In today's days is difficult to give in one idea the huge extent of 'zero' and seems "impossible without it".

References

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1. Ifrah, George (1998)" The Universal History of Numbers from Prehistory to the Invention of the Computer". ISBN 1-86046-324-X
2. Room, Adrian "The Guiness Book of Numbers". ISBN 0-85112-372-3
3. Asimov, Isaac (1989) "Asimov's Chronology of Science and Discovery".
    ISBN 0-246-13669-3
4. Hollingdale, Stuart "Makers of Mathematics". ISBN 0-14-022732-6