THE EMERGENCE
OF STATISTICAL SCIENCE

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Eadem mutata resurgo

(inscription on the tombstone of J. Bernoulli)

Summary: In this short note the origin of the word "statistics" is explained. Girolamo Ghilini was the first who used that word in 1663. G. Achenwall coined the artificial word "Statistik", not existing in German language, and used it to name the science about states. Scotsman J. Sinclair stolen this word from German and introduced into English. K. Pearson, expressing the gratitude for Sinclair, said that we had to bless this robbery.

Keywords: history of statistics, Achenwall, Ghilini.

1. Introduction

The history of statistics has never yet been properly written. This is the phrase opening the book published in 1978, one of the most fascinating books on the history of statistics. The book contains the lectures by Karl Pearson given at University College London during the academic sessions 1921–1923. The book has been edited and published posthumously by Egon Pearson, Karl's son. For 60 years after these words several book about the history of statistics have been published, but Pearsonian lectures one reads like a best novel. History and statistics are related in a way nicely described by Georg Sarton in 1935:

I like to think of the constant presence in any sound Republic of two guardian angels: Statistician and the Historian of Science. The former keeps his finger on the pulse of Humanity, and gives the necessary warning when things are not as they should be. If Statistician is like a physician, the Historian is like a priest, – the guardian of man's most precious heritage, of the one treasure which, whatever may happen, can never be taken away from him – for the past is irrevocable.

Writers about the history are usually content to accept what the other had written, because it takes much time to read the original, and

besides one needs to know various languages. The elementary errors are repeated in many textbooks. K. Pearson mentioned some examples: many Germans still call Achenwall the "father of Statistics", the fundamental curve in statistics is attributed to Gauss instead of de Moivre, who is also the inventor of Bernoulli's Theorem. One can add to these examples that many Italians are convinced that the word "statistica" has been used by Ghilini as early as 1589.
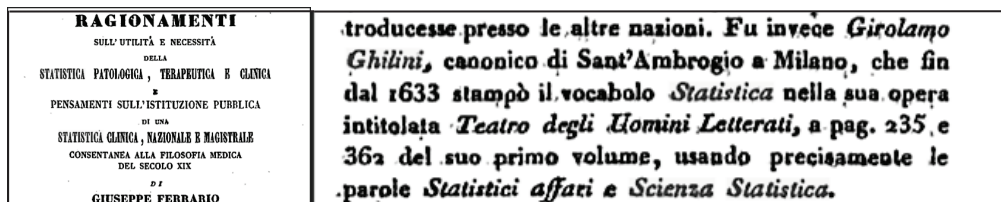
In this note the origin of the German use of the word "Statistik", the first use of an adjective "statistica" in Italian language, and the first use of this word in English language, in the form "statistics" are accounted.

2. The name of a *pulcherrima disciplina*

The known Italian statistician Giuseppe Leti in his interesting article: *The birth of statistics and the origins of the new natural science* writes the following:

Although Italians were denied the possibility of contributing to the development of statistics nonetheless something Italian does remain: the name. In 1589 Gerolamo Ghilini used the word "statistics" as an adjective in the title of his book, "Ristretto della civile, politica, statistica e militare scienza".

This assertion was, and still is, repeated by many authors (including also the writer of this paper), but the true is following: Gerolamo (Girolamo) Ghilini was born in 1589. So it was rather impossible for him to publish a book in the year of his birth. My search for the writings of Ghilini was unsuccessful. The only reliable source which I was able to discover, is the book by Giuseppe Ferrario published in 1839. The first page of it, and the excerpt where Ghilini is mentioned, are reproduced below.

RAGIONAMENTI
SULL' UTILITÀ E NECESSITÀ
DELLA
STATISTICA PATOLOGICA, TERAPEUTICA E CLINICA
E
PENSAMENTI SULL'ISTITUZIONE PUBBLICA
DI UNA
STATISTICA CLINICA, NAZIONALE E MAGISTRALE
CONSENTANEA ALLA FILOSOFIA MEDICA
DEL SECOLO XIX
DI
GIUSEPPE FERRARIO

troducesse presso le altre nazioni. Fu invece *Girolamo Ghilini*, canonico di Sant'Ambrogio a Milano, che fin dal 1633 stampò il vocabolo *Statistica* nella sua opera intitolata *Teatro degli Uomini Letterati*, a pag. 235 e 362 del suo primo volume, usando precisamente le parole *Statistici affari e Scienza Statistica*.

In the free translation one reads this excerpt as follows:
it was Girolamo Ghilini, a canon in St. Ambrosio in Milan, who had used the word Statistica *in the first volume of his work titled* Teatro degli

Uomini Letterati *published in 1633. In pages 235 and 362 he used very carefully expressions* Statistical matter *and* Statistical Science.

The Italian word "statistica" was used as an adjective of a feminine gender, so that the phrase "scienza statistica" means exactly statistical science. This science has been defined as a description of the features which characterizes the state.

In the other book by G. Ferrario, *Statistica medica di Milano* published in 1640 in Milano, we find the following information:
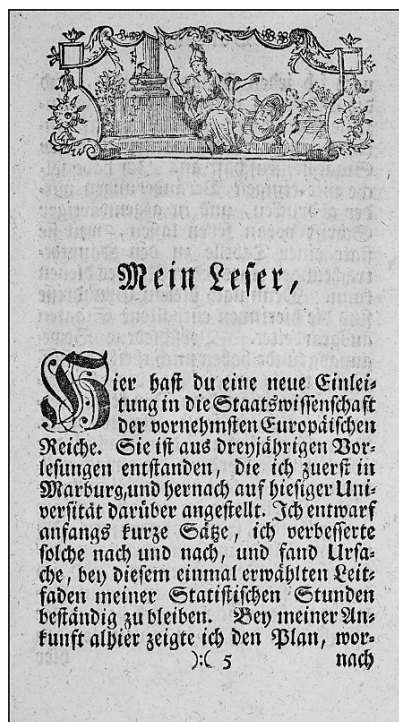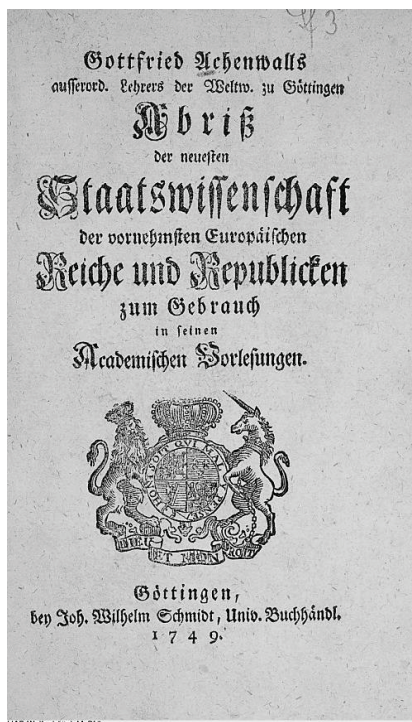
1633	Girolamo Ghilini, canonico di S. Ambrogio in Milano, stampa l'opera *Teatro degli Uomini letterati,* in cui adopera a pagine 235 e 362 del primo volume, i vocaboli *Statistici* affari, e scienza *Statistica;* dunque l'italiano vocabolo *Statistica* fu qui pubblicato per lo meno 116 anni avanti il 1749, tempo in cui lo usò il professore Achenwall di Gottinga, al quale da molti scrittori moderni si attribuì erroneamente l'invenzione di tale parola.

This means following: Italian word "Statistica" had been published at least 116 years before 1749, when it was used by professor Gottfried Achenwall from Göttingen and many of the modern writers incorrectly attribute the invention of this word to him.

Without any doubt, the word "statistica" etymologically derives from the Latin *ratio status*, or Italian phrase *ragione di stato*. It was used for the first time by Giovanni Botero (1540–1617) in his book entitled *Della ragione di stato*, published in Venezia in 1589.
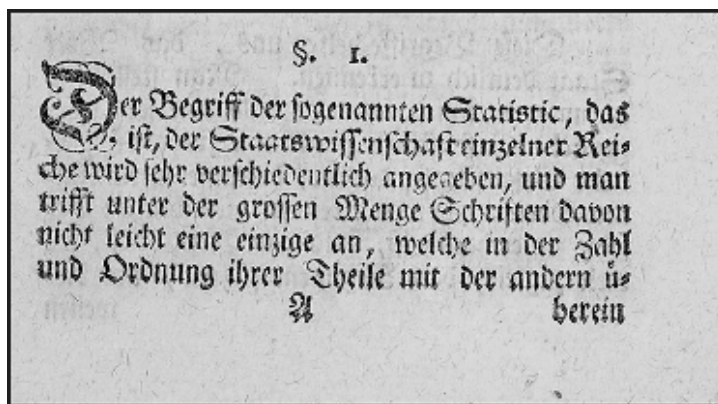
Stato è un dominio fermo sopra popoli; e Ragione di Stato è notizia di mezi atti a fondare, conservare, e ampliare un Dominio così fatto. Egli è vero che, se bene, assolutamente parlando, ella si stende alle tre parti sudette, nondimeno pare, che più strettamente abbracci la conservatione, che l'altre; e dell'altre più l'ampliatione, che la fondatione.

The word "Statistik" (i.e. statistics), as a noun, was introduced by Achenwall in 1749 in the book *Abriß der neuesten Staatswissenschaft der heutigen vornehmsten europäischen Reiche und Republiken zum Gebrauch in seinem Academischen Vorlesungen*. The first page of the book is reproduced below.

As one can see from the words to a reader (*Mein Leser*), the Achenwall's book was based on the notes to his lectures on the science of state which he started in Marburg in 1746. These notes he considered as a guide to statistical lessons (*Leitfaden meiner Statistischen Stunden*). In the foreword Achenwall explains that "the term of the so-called Statistic, which stands for science of state is understood very differently in many works, and it is not easy to choose the most appropriate meaning of this term". In his own words:

Der Begriff der sogenannten Statistic, das ist, der Staatswissenschaft einzelner Reiche wird sehr verschiedentlich angegeben, und man trifft unter der grossen Menge Schriften davon nicht leicht eine einzige an, welche in der Zahl und Ordnung ihrer Theile mit der andern überein kommen sollte. Es ist also nicht undien-lich, dasjenige, was man sich unter diesem Namen eigentlich vorzustellen hat, und was in ihrem Umfange enthalten ist, zu untersuchen, und die natürliche Einrichtung und Verbindung ihrer Abtheilungen fest zu setzen.

The term "Statistik" instead of "Statistics" has been used in manuscript left by Achenwall to the University of Göttingen. Let us quote here the excerpt from V. John:

In this manuscript which bore the inscription "Anfang der Vorbereitung zur Statistik", and headed "An etymological argument", the following passage occurs: The word statistik does not owe its derivation to the German word Staat, but is taken from the Italian ragione di stato unde barbarum voc. Latinum effectum ratio status; – disciplina de ratione status, which was taken by practical politicians to mean a knowledge of the state and its constitution; and further, from ragione di stato the Italian first coined the word statista meaning the same as the French homme d'etat, and the English statesman. Again, in another place he says, statistik – a term not new, derived from ragione di stato.

Considering statistics as a knowledge of the state and its constitution rather than as the science of the state, Achenwall changed the title of subsequent editions of his work by substituting *Staatsverfassung* for *Staatswissenschaft*.

In the latter editions Achenwall gave the following, indirect, definition of statistics (see [Sheynin 2009]):

In any case, statistics is not a subject that can be understood at once by an empty pate. It belongs to a well digested philosophy, it demands a thorough knowledge of European state and natural history taken together with a multitude of concepts and principles, and an ability to comprehend fairly well very different articles of the constitutions of present-day kingdoms.

The first who introduced the word "statistics" in English language was Sir John Sinclair (1754–1835). He was a Scottish politician, writer on finance and agriculture. Desolated by the loss of his first wife, he

spent seven months at the end of 1786 and the beginning of 1787 in a tour of northern Europe, he went even so far as to Moscow. He was fascinated with political arithmetic, so he came across with the Göttingen school of political economy where the word "Statistik" was used. The methods of investigations used by political arithmeticers, and the school founded by Achenwall were drastically different. Political arithmetic was based on numerical mode of reasoning, Göttingen school used instead not number, but wordy descriptions. J. Sinclair was fascinated more by the name than by methods. After returning to Scotland he performed alone almost impossible work. Sir John Sinclair, in his monumental, 20 volume, work (each ca 600–700 pages) titled *Statistical Account of Scotland*, published in years 1791–1799, has introduced the word "statistics" into English language. He explained also a difference in the meaning of that term used by German and by himself in following way: *by statistical I mean in Germany, an inquiry for the purpose of ascertaining the political strength of a country or questions respecting matters of state; whereas, the idea I anex to the term, is an inquiry into the state of a country for the purposes of ascertaining the quantum of happiness enjoyed by its inhabitants, and the means of its future improvement.*

K. Pearson in his *History...* characterized this use as follows:

A Scotsman steals the words "Statistics" and "Statistik" and applies them to the data and methods of "Political Arithmetic". It was certainly a bold, bare-faced act of robbery which Sir John Sinclair committed in 1798. It would exactly paralleled if somebody stole our word biometry and applied it in a totally different sense to that of its creators!. Well, we have to bless Sinclair, for a while "arithmetic" or better "algebra" served to mark the essentially mathematical character of our science, the word "political" was really inappropriate to its purpose.

In 1999 J. Nelder has argued that *statistics should be called statistical science, and that probability theory should be called statistical mathematics (not mathematical statistics)* […] *statistical science is not just about the study of uncertainty, but rather deals with inferences about scientific theories from uncertain data.* So, after 366 years we returned to the term *scienza statistica*, like in the inscription on the Bernoulli's tombstone: "Although changed, I arise the same."

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POJAWIENIE SIĘ NAUKI STATYSTYCZNEJ

Streszczenie: W artykule tym wyjaśniono pochodzenia słowa „statystyka". Pierwotnie, w postaci przymiotnikowej, zostało użyte przez włoskiego kanonika Girolama Ghiliniego. Wbrew ogólnej opinii, rozpowszechnianej także przez Włochów, słowo to zostało użyte po raz pierwszy w 1663 r., a nie w 1589. Słowa „statystyka" w postaci rzeczownikowej użył po raz pierwszy niemiecki państwoznawca Gottfried Achenwall w 1749 r. Szkocki szlachcic John Sinclair wprowadził to słowo do języka angielskiego w 1791 r.

Słowa kluczowe: statystyka, historia statystyki, Achenwall, Ghilini.