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## CESÀRO'S NACHLASS

*Luciano Carbone\* - Giuseppe Cardone\* - Franco Palladino\*\**

**E**RNESTO CESÀRO (1859-1906) was one of the most prominent Italian mathematicians of the second half of the nineteenth century.<sup>1</sup> He dramatically died when trying to save his son in a stormy sea. His numerous family had a lot of economic difficulties; nevertheless his wife Angelina and his first son Mario very lovingly looked after his papers (drafts, books, letters, etc.).

In 1987, his grand-daughter Vittoria committed them to the care of the "Department of Mathematics and Applications R. Caccioppoli" of University Federico II of Naples.

Cesàro's *Nachlass* is large enough. It contains about 350 scientific books, about 250 years issues of scientific reviews, about 3000 off-prints. Now special catalogues of these subjects are available.

The most interesting part of Cesàro's *Nachlass* is the epistolary. It contains about 3100 letters; about 2300 letters were sent to Cesàro, generally well preserved, and about 500 are drafts of Cesàro's letters, generally in a very poor condition. Moreover, there are about 300 other letters, generally letters of Cesàro's relatives.

Some letters were published by Cesàro himself and his correspondents.

Many of Cesàro's correspondents are very famous: Hermite, Catalan, E. Landau, Cremona, Beltrami and so on. We give here the complete list of senders and addressees in which we indicate also the number of letters sent to Cesàro or drafts of Cesàro's letters, respectively.

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## SENDERS

Adinolfi, G.	2	Blaserna, P.	2	Cazzaniga, T.	1
Agresti, A.	1	Bocca (F. Ili)	1	Cera, A.	1
Aiello, C.	15	Boccardi, G.	18	Cerruti, V.	46
Alasia, C.	6	Bohren, A.	3	Certo, L.	20
Albeggiani, G.	1	Bolza, O.	2	Cesari, O.	2
Albeggiani, M. L.	1	Boncompagni, B.	11	Cesàro, Angelo	3
Aloysio, V. A.	1	Bormans, A.	1	Cesàro, Antonio	32
Alvano, L.	13	Bortolotti, E.	6	Cesàro, Amalia	2
Amanzio, D.	2	Bottone, M.	1	Cesàro, Edoardo	3
Amato, V.	3	Bovio, G.	1	Cesàro, Enrico	31
Ambruosi, F.	1	Brambilla, A.	22	Cesàro, Florestano	8
Amodeo, F.	30	Brandi, S.	3	Cesàro, Fortuna	1
Ammassi, E.	2	Broglio, A.	3	Cesàro, Francesco	6
Andervies, I.	2	Brusa, R.	2	Cesàro, Giuseppe	113
Angelitti, F.	3	Buoniconti, B.	1	Cesàro, Irene e Angelina,	1
Antomari, X.	1	Busse, F.	1	Cesàro, Lucia	9
Arzelà, C.	8	Cadosch, G.	2	Cesàro, Luigi (brother)	9
Asdente, A.	1	Calò, B.	5	Cesàro, Luigi (father)	9
Ascione, E.	1	Calvitti, G.	17	Cesàro, Pasquale	9
Aurili, G.	1	Cammariello, P.	1	Cesàro (relatives)	1
Bagnera, G.	8	Cannizzaro, G.	2	Chiappetti, F.	2
Balbiano, L.	2	Cantone, A.	1	Chieffi, O.	3
Baldassarre, A.	1	Cantone, M.	2	Chistoni, C.	4
Balitrond, F.	5	Capece, G.	1	Chiurazzi, E.	3
Ballo, M.	5	Capelli, A.	11	Ciampoli, A.	1
Bassani, A.	10	Capobianco, I.	1	Cifarelli, T.	2
Bassani, F.	23	Cappello, C.	2	Cipolla, M.	4
Basso, A.	5	Carafa	1	Cirillo, G.	1
Battaglia, D.	3	Carola, A.	1	Cirillo, R.	1
Battaglioni Egg, A.	1	Carotenuto, F.	2	Civallero, B.	5
Battaglioni, G.	6	Carpetta	1	Clacyz, I.	1
Battelli, A.	1	Cascino, M.	1	Clausen, C.	6
Bellini, E.	2	Casilli, P.	3	Clément	2
Beltrami, E.	17	Cassisa, S. G.	1	Compagna, L.	1
Beman, W. W.	6	Castellano, F.	1	Compagna, P.	1
Berger, A.	1	Castelli, E.	1	Conigliaro, S.	1
Bianchi, L.	4	Catalan, E.	51	Consagro, G.	1
Biasi, G.	1	Cavazza, P.	1	Cons. de Belgique à Naples	2

CESARO'S NACHSCHLAG

Coradi, G.

Cork Wilson, J.

Corona, S.

Correale, E.

Cottreau, A.

Couvrat, L.

Cremor.

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Coradi, G.	4	De Rubertis, E.	13	García de Galdeano, Z.	3
Cork Wilson, J.	1	De Saussure, R.	1	García de Zuñiga, E.	2
Corona, S.	1	D'Escamard, V.	18	Garofalo	1
Correale, E.	2	D'Escamard, L.	5	Garollo, G.	1
Cottrau, A.	1	De Strekalof, V.	1	Gaspard	1
Couturat, L.	1	Di Chessio, V.	1	<i>Gauthier-Villars, editeur</i>	41
Cremona, L.	28	Di Dia, G.	2	Gebbia, M.	1
Crepjat, M.	1	Dienes, P.	2	Gennaro, R.	1
Crispo, S.	7	Di Greci, G.	1	Genocchi, A.	1
Cuccurullo, L.	7	Dini, U.	7	Gerbaldi, F.	43
D'Addozio	1	Dino Salvatore, N.	44	Gerono, C.	1
Dagnino, T.	1	D'Ocagne, M.	23	Gilbert, P.	1
D'Agnone, C.	3	D'Ovidio, E.	7	<i>Ginn &amp; C.</i>	2
Damiani, A. G.	1	Dreyfus, A.	1	Giordano, G.	10
Darboux, G.	1	Duhem, P.	1	Giudice, F.	36
D'Arcais, F.	3	Duran-Loriga, J.	4	Goblet, P. J.	1
D'Atri, R.	1	Elefante, S.	2	Godefroy, M.	3
De Angelis, E.	2	Errante, F. P.	3	Golla, L.	48
De Berardinis, G.	1	Falco, A.	1	Gomes Teixeira, F.	18
Decq, E.	8	Fanquemberg, E.	2	Göschl, F.	1
De Falco, V.	1	Fazzari, S.	1	Goulard, A.	1
De Francesco, D.	1	Federici, S.	9	Graspi, N.	3
De Gasparis, A.	2	Fergola, E.	4	Grassi, O.	1
Del Buontronchini	1	Filippone, L.	1	Grassmann, J.	1
Del Giudice, E.	3	Finocchiaro, C.	2	Gravè, D.	1
Del Giudice, M.	7	Florida, G.	1	Gregoraci, P. N.	1
Della Rocca, G.	1	Foà, F.	2	Grevi	1
De Lorenzo, G.	2	Fock, G.	1	Guccia, G. B.	2
Del Pezzo, P.	9	Ford, H. B.	2	Guimarães, R.	10
Del Re, A.	6	Forte, G.	2	Guerrieri, R.	1
De Luca, E.	1	Fouret, G.	3	Hadamard, J.	1
De Luca, I.	1	Fragello, V.	7	Haiez, F.	3
De Mare, E.	2	Franceschini, A.	1	Halphen, G. H.	2
De Martino, A.	1	Franchi, P.	2	Hammer, V. E.	1
Demonceau, M. L.	1	Francken, E.	2	Happe, E.	1
De Montel, E.	2	Frattini, G.	4	Hauben, G.	2
Denalques	1	Gallucci, G.	2	Hayez	1
De Pasquale, V.	1	Galton, F.	1	Hermann, A.	6
De Rinaldis, U.	1	Gambioli, D.	1	Hermite, C.	34
De Rosis, E.	1	Garbieri, G.	11	Hernandez, E.	2

Hoste, A.	1	Lugli, A.	3	Narducci, E.	1
Imperato, A.	10	Lupò, P.	1	Neuberg, J.	57
Infante, M.	2	Macaluso, D.	5	Nicolais, R.	3
Iowa, L.	1	Macchiati, L.	2	Nitti, F. S.	1
Iacobelli, F.	6	Macfarlane, A.	2	Nobile, A.	1
Jahnke, E.	5	Maillet	2	Nobile, V.	6
Jamet, E. V.	1	Maiuri, G.		Nocelli, G.	2
Janni, V.	3	Mancini, E.	2	Odell Lovett, E.	6
Jannone, D.	1	Mannheim, V.	1	Oglialoro, A.	4
Jennaco, R.	1	Maggi, G. A.	1	Oltramare, G.	2
Kamerlingh Omnes, H.	1	Mansion, P.	20	Onorati, P.	1
Kapteijn, W.	2	Manville, O.	1	Ottali, A.	10
Kerbaker, E.	4	Marchi, V.	1	Padé, H. E.	2
Kerbaker, M.	2	Marcolongo, R.	16	Pagano, G.	1
Klein, F.	1	Marotta, G.	2	Pannunzio, B.	1
Kowalewski, G.	23	Martinetti, V.	1	Paraggio, G.	1
Kümmer, M.	2	Martini, A.	1	Pascal, C.	1
Laisant, C. A.	9	Martone, B.	4	Pascal, E.	10
La Maestra, A.	13	Masoni, U.	4	Pastore, C.	1
La Marca, R.	2	Mastellone, C.	10	Pastori, C.	1
Landau, E.	2	Mastropasqua, A.	1	Paterna, B. L.	2
Landis, W. W.	1	Mastropasqua, I.	2	Paternò, F. P.	1
Landolfo Di Carlo, L.	2	Massarini, I.	5	Pratracci, C.	1
Lang, E.	2	Mattia, D.	1	Peano, G.	26
Laurent, N.	2	Mauri, G.	1	Pellerano, B.	1
Lauricella, G.	3	Medugno, L.	2	Pelz, C.	2
Lauro, F.	1	Mehmke, R.	1	Pepe, G.	2
Lémeray, E. M.	1	Mercoghiano, D.	1	Perna, A.	70
Lemoine, E.	36	Mestica, G.	3	Perrella, F.	1
Lerch, M.	3	Mina, L.	1	Perugini, F. S.	1
Letizia, E.	1	Miniero, F.	1	Pervouchine, I. M.	3
Levi Civita, T.	5	Miola, G.	1	Picard, E.	1
Levozzo, L.	2	Miraglia, L.	2	Picarelli, A.	1
Liagre, I.	2	Mollame, V.	1	Pietrocola, C.	6
Lipschitz, R.	1	Monod, E.	1	Pincherle, S.	5
Loescher, E.	1	Montesano, D.	17	Pinto, L.	8
Longchamps, G. G. de	2	Morera, G.	2	Pirondini, G.	14
Lozzi, G.	6	Morisani, E.	1	Pirondini, E.	1
Loria, G.	3	Mortara, L.	1	Pitocco, V.	13
Lucas, E.	2	Murino, P.	1	Pitrè, G.	2

CESARO'S NACHSCHLASS

Pizzarello, D.  
Pizzetti P.Poincaré, H.  
Poncin-Le Roy, rPorszasz, I.  
Préside J.  
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CESARO'S NACHSCHLASS

Pizzarello, D.	2	Scaraviglia, T.	1	Tenaglia, O.	1
Pizzetti P.	1	Scarpis, U.	1	Teubner, B. G.	26
Poincaré, H.	2	Scheffers, G. W.	3	Theriat, L.	2
Poncin-Le Roy, F.	2	Schiano, S.	1	Tirelli, F.	1
Porszasz, I.	1	Schiappa, A.	5	<i>Univ. of Chicago Press</i>	1
<i>Preside Liceo V. Emanuele</i>	2	Schilling, M.	3	Todisco, G.	1
Procaccini, T.	3	Schipa, M.	1	Tonelli, A.	2
Prost, N. A.	1	Sciliguere, D.	8	Torelli, G.	34
Quarati, G.	1	Segre, C.	5	Torracca, T.	1
Ragusa, F.	1	Seiliger, D.	1	Trotta, T.	1
Raimondi, E.	1	Semmola, E.	1	Tucci, G.	1
Rapanelli, B. G.	3	Semmola, M.	1	Vacca, G.	5
<i>R. Ist. Incoraggiamento</i>	1	Servillo, G.	1	Van den Berghe, R.	1
Realis, S.	2	Setaro, P.	1	Van Goethem, E.	1
Rebeschini, C.	16	Setti, E.	1	Vasquez, F. C.	1
Rega, G.	1	Sferra, L.	2	Vassilief, A. V.	8
Repetto, G.	1	Sguro, A.	1	Veblen, O.	2
Respighi, L.	1	Siacci, F.	30	Viesca, F.	1
Reyes, Prosper V.	2	Sibriani, F.	2	Vigarci, E.	1
Riccardo, G.	1	Simone, G.	1	Villari, E.	1
Ricci, G.	4	Simonis, G. B.	1	Viol. P.	1
Riccò, A.	2	<i>Sindaco di T. Annunziata</i>	1	Vitelli, R.	1
<i>Richard-Ginori</i>	2	Smith, D. E.	3	Vivanti, G.	3
Rindi, S.	1	<i>Società Vinicola Taurisana</i>	1	Volterra, V.	4
Romanelli, L.	1	Solimene, M.	1	Weile, J.	3
Rodrigues, J. M.	1	Somigliana, C.	2	Wenigarts, I.	1
Rossi, C.	7	Sorvillo, G.	2	Wölffing, E.	1
Rouché, A.	3	Sos, E.	3	Zangara, G.	2
Rougé, C.	3	Soumagne, C. M.	8	Zanichelli, N.	1
Ruggiero, A.	3	Spaerre, E.	1	Zanini, C.	1
Ruggiero, M.	1	Spandò, D.	1	Ziwet, A.	2
Russo, G.	6	Spandò, V.	1	Zona, E.	11
Salerni, A.	13	Spinazzola, V.	1	Zuloaga, E.	1
Sannia, A.	1	Stäckel, P. G.	1		
Sannia, G.	4	Stasi, F.	7		
Santamaria	1	Strassi, A.	2		
Santoro, O.	7	Strazzeri, V.	9		
Savino, S.	2	Sylvester, J. J.	1		
Scaglietta	1	Tannery, J.	2		
Scajola, E.	1	Tedeschi, G.	1		



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Sannia, A.	1	Semmola, E.	1	Veblen, O.	1
Scheffers, G. W.	3	Siacci, F.	2	Viesca, F.	1
Schilling, M.	14	Thomas, A.	1	Viola	1
Segretario Scuola F. Gioia	1	Teubner, B. G.	8	Eona, E.	3
Secr. Acad. royale de Belg.	1	Torelli, G.	5		

The Drafts whose addressees are not identifiable are 127 (103 in Italian, 24 in French).

Naturally, a lot of manuscripts, sometimes fragmentary and sometimes not published, of Cesàro's works and courses taught to Cesàro and given by Cesàro are contained in the *Nachlass*. Special catalogues of these topics are available, too. There is also a very large mass of fragments: work notes, calculations, bibliographic references and so on. Several domestic and official documents are preserved, too.

A lot of papers contained in the *Nachlass*, enlighten interesting historical subjects as the birth of divergent series, summability theory and the introduction of new ideas about curves.

The Cesàro's role and his creativeness in these subjects, can be well illustrated by quoting two references from Hardy (1949), p. 8 and Mandelbrot (1982), p. 43.

Hardy says:

In modern times it [i. e. the idea, of summability of a, divergent series] was used implicitly by Frobenius and Hölder in 1880 and 1882; but it does not seem to have been stated formally as a definition until 1890 when Cesàro published a paper<sup>2</sup> on the multiplication of series in which, for the first time, a "theory of divergent series" is formulated explicitly. "Lorsque  $s_n$  sans tendre vers une limite admet une valeur moyenne  $s$  finie et déterminée nous dirons que la série  $a_0 + a_1 + a_2 + \dots$  est simplement indéterminée et nous convenons de dire que  $s$  est la somme de la, série" [...] Cesàro goes on to consider series "*r*-fois indéterminées", and proves a general theorem which will be prominent in Ch. X. Cesàro's paper has become famous and his language now seems almost absurdly modest: "il résulte de là une classification des séries indéterminées qui est sans doute incomplète et pas assez naturelle...". In fact this classification is entirely natural.

Mandelbrot writes:

An alternative construction of the Koch island is given in Cesàro 1905, a work<sup>3</sup> of such charm as to make me forget the hard search for the original [...]. Here is a free translation of a few ecstatic lines. "This endless imbedding of this shape into itself gives us an idea of what Tennyson describes somewhere as the *inner* infinity, which is after all the only one we could conceive in Nature. Such similarity between the whole and its parts, even its infinitesimal parts, leads us to consider the triadic Koch curve as truly marvelous. Had it been given life, it would not be possible to do away with it without destroying it altogether for it would rise again and again from the depths of its triangles, as life does in the Universe".

Eventually, we want to inform that some epistolary correspondances have been already published and some others are being now published<sup>4</sup>.

CESÀRO'S NAME

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## NOTES

1. For a Cesàro's biography cf. Perna (1907).
2. Cf. Cesàro (1890).
3. Cf. Cesàro (1905).
4. Cf. Palladino (1993); Ferraro and Palladino (1994) (the letters of G. Battaglini and A. Egg to E. Cesàro are contained in appendix); Carbone, Nastasi and Palladino (1996); Carbone, Cardone, and Palladino (1994); Carbone, Ferraro and Palladino (*RHM*) and (*RQS*); Palladino and Tazzioli (1996).

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(*RHM*) «The epistolary correspondence between Charles Hermite and Ernesto Cesàro», to be published in *Revue d'histoire des mathématiques*.  
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