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FOCUS - Intelligenza Artificiale tra storia, diritto e politica

STUDI E RICERCHE

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Indice 1 / 2024

Editoriale

Antonio Iodice

Affrontare la macro-tematica dell'Intelligenza Artificiale è un imperativo a cui la nostra *Rivista* – da sempre caratterizzata da un approccio interdisciplinare che tenta di coniugare esposizione scientifica e divulgazione affidabile – non può evitare. Nondimeno, la pretesa di trattare questo concetto polisemico in tutte le sue sfaccettature avrebbe prodotto un risultato parziale, insoddisfacente e scientificamente insostenibile. Come ben spiegato dal curatore del Focus, Leonardo Masone, qui analizziamo se e come la presenza sempre più "invadente" della tecnologia – ovviamente nella sua versione digitale – influenzi la nostra vita quotidiana. La risposta, *ça va sans dire*, non può che essere positiva. Certamente, molta acqua è passata sotto i ponti da quando – nell'incredibilmente lontano 1950 – Alan Turing descrisse nel suo saggio «Computing Machinery and Intelligence» (sulla rivista *Mind*, n. 59, pp. 433-460) l'attitudine da parte di alcune "macchine" a compiere alcuni compiti cognitivi – per quanto elementari – che un ignaro interlocutore avrebbe attribuito agli esseri umani. I proto-computer di Turing, che arrivò a misurarne "l'intelligenza" con un apposito ed eponimo test, non dovevano ragionare, in effetti, ma solo "apparire" intelligenti, simulando conversazioni umane, favorite dal fatto che il loro aspetto fisico fosse celato. Ovviamente, come conseguenza della precedente condizione, alla macchina non veniva chiesto di interagire con l'ambiente circostante, esentandola di fatto da una parte importante della *constituency* umana, vale a dire la percezione fisica dell'ambiente su cui insiste la nostra attività. È cambiato il mondo, rispetto a quella stagione avveniristica e sperimentale: la rivoluzione digitale fornisce ai giorni nostri il software per un perfezionamento tale delle macchine da contraddistinguere la nostra epoca. Oggi, in fondo, la linea del progresso è dettata dall'attuale orizzonte

delle capacità implementate da *intelligenze-non-umane* e domani lo sarà dall'orizzonte futuro, rispetto al quale – secondo una letteratura interdisciplinare e persino interconfessionale – l'unico limite pare rappresentato dall'etica. Cosa è lecito che faccia una macchina? Quando si dovrebbe fermare? Entusiasma o spaventa un soggetto privo di sostanze organiche che non si riconosca in alcuna bioetica, che non abbia il dono della carità, l'istinto alla pietà, neppure il pensiero della conservazione della sua (non-)specie? Neanche la preoccupazione per la sua, di sopravvivenza. Leonardo Masone mostra subito il proprio debito intellettuale nei confronti di Foucault, tra gli intellettuali novecenteschi maggiormente convincenti (e radicali) nel denunciare i dispositivi di controllo "istituzionale", dunque socialmente accettato, con maggiore o minore consapevolezza, da parte di coloro che sono controllati. Quindi, di noi cittadini e cittadine, ridotti nella sostanza al rango di nuovi sudditi. Personalmente, abbiamo una storia biografica e un'impostazione valoriale che ci portano altrove, nella ferma convinzione che la partecipazione sociale e politica non sia un orpello privo di contenuto, ma un solido ancoraggio nei confronti dei marosi che sballottano la democrazia liberale e rappresentativa. Qui tocchiamo un punto fondamentale, sul quale non possiamo non concordare con il Curatore del Focus: anche l'Intelligenza Artificiale, come ogni stadio tecnologico (a maggior ragione per quelli che pretendono di diffondersi massivamente tra la popolazione), va analizzata come una pratica di potere e, in quanto tale, mette il ricercatore e, soprattutto, il cittadino, di fronte a un bivio. Da un lato, il rinnovamento del sapere collettivo, i benefici per le scienze, l'allentamento della fatica per i lavori più usuranti (si pensi all'automazione nelle fabbriche e nei magazzini, dove ancora si muore a livelli inaccettabili); dall'altro, il rischio di una società segmentata sulla base della maggiore o minore vicinanza alle nuove tecnologie digitali, con il paradosso che persino le istituzioni richiedano un livello minimo di competenze per il pieno godimento dei diritti di cittadinanza oppure, banalmente, per ritirare la pensione. La sfida del futuro sta proprio qui, in bilico tra alta filosofia e necessità quotidiane. Un *parterre* di autori di tutto rispetto ci aiuta – attraverso contributi per il cinquanta per cento in lingua inglese (a conferma di come determinati ragionamenti abbiano oggi una valenza globale) – a dirimere la matassa così intricata: c'è con-

tinuità e non contraddizione tra la sottile speculazione filosofica di Pasquale Grieco (nel suo argomentare il ruolo antropologico del soggetto nelle nostre società "ibride") e l'approccio normativo di Paola Manes, che indaga il rapporto spesso bellicoso tra le multinazionali dell'Ict e gli Stati-nazione, a conferma di come l'interdisciplinarietà possa confrontarsi con una tematica "olistica" come l'IA. Il mondo agricolo – in apparenza assai lontano dallo sviluppo dei software più arditi – è il protagonista dell'articolo di Leonardo Masone e di Eléna Grobler, così come la delicata tematica della salute mentale funge da sfondo per il contributo di Dan Mcquillan. La definizione di "robot sociale" pare un ossimoro, quantomeno una categoria che merita ulteriori spiegazioni: le forniscono Marta Vitale e Alessandro D'Oronzo, con un accento particolare rivolto al cosiddetto "disimpegno morale", mentre spetta a Ivano Zanzarella approfondire il rapporto – insolito, affascinante ed "eufonico" – tra l'Intelligenza Artificiale e la produzione di musica. Come sempre, il Focus – pur nella sua configurazione ampia, diversificata e armonica – non esaurisce la proposta scientifica e divulgativa della *Rivista*: in questo numero Stefano Taccola offre una competente lettura del concetto di *oikonomia* nella *Politica* di Aristotele, mentre Antonio Scoppettuolo – da tempo caro amico di queste pagine – affronta la questione dell'ordine morale sulla falsariga della letteratura del filosofo ed economista salernitano Genovesi, di cui è uno dei massimi esegeti. In attesa che la divisiva tematica dell'autonomia differenziata entri in maniera fragorosa nel dibattito sociale, Candido Volpe propone un'utile analisi sul ruolo degli enti territoriali nel sistema economico globalizzato. Confidando, invece, in una pace che – alle latitudini del Medio Oriente – oggi pare lontana e utopistica, Silvano Poli osserva la guerra tra Israele e Palestina dalla prospettiva, importante eppure spesso negletta, del supporto statunitense a Tel Aviv, riconducendolo, più che a ragioni di alleanze strategiche, a una comune visione della politica, letta in entrambi i casi attraverso le griglie interpretative del Vecchio Testamento, ipostatizzando la Legge dei Padri e dogmatizzando l'idea di un popolo virtuoso, che la modernità cerca di corrompere. Più che pronosticare il posizionamento del nuovo presidente americano, quindi, sarebbe utile comprendere quanto siano profonde (e diffuse) queste radici.

Introduzione

Leonardo Masone

Il linguaggio medico antico ha quasi certamente originato il concetto di κρίσις, elaborato forse tra gli altri proprio da Ippocrate che in esso vedeva il verificarsi dell'alternativa tra vita e morte del malato. Entrambe come dimensioni ontologiche in formazione. In generale, con affermazione parziale, si potrebbe dire che la crisi avviene quando un sistema di idee, con il proprio arsenale teoretico e pratico, che ha retto un'epoca storica, non appare più in grado di sostenere i processi imprevedibili di cambiamento e si sente l'esigenza di modificarlo o addirittura di sostituirlo definitivamente: un fenomeno che, per dirla con Koselleck, si reitera periodicamente "lungo la linea crescente del progresso", dalla durata incerta, ma dall'impatto decisivo per la storia umana.

La progressiva pervasione quotidiana delle tecnologie digitali in questa ultima fase della contemporaneità è foriera di crisi? Probabilmente anche in maniera più profonda di quanto noi stessi riusciamo a pensare. Essa rappresenta un momento di crisi e di ripensamento di alcune, o forse della stragrande maggioranza, delle categorie interpretative fondamentali che finora hanno garantito una comprensione delle condizioni storiche in atto. La crisi è soprattutto del soggetto in qualità di agente morale, sociale e politico e la progressione della rivoluzione digitale ne segna un'ulteriore tappa ancora più cogente. Ed è in questo contesto "rivoluzionario" che va urgentemente ripensato lo stato della conoscenza e organizzata attraverso l'ausilio di nuovi e più adeguati strumenti critici afferenti necessariamente anche alle discipline che appaiono estranee alla cultura digitale. Rivoluzione e crisi possono essere concettualizzate correttamente solo attraverso un approccio interdisciplinare, o meglio transdisciplinare. In questo modo si può fare piena luce sulle probabili conseguenze etiche e politiche che colpiscono le società democratiche.

A sostegno delle nostre riflessioni, viene alla mente il concetto foucaultiano di *episteme*, per intendere i sistemi di pensiero e conoscenza regolati che operano sul soggetto al fine di costruire domini linguistici, semantici e soprattutto ideali, aperti, di un determinato periodo storico. Tali formazioni discorsive che non si presentano come totalità lineari chiuse in un'epoca, sono al contrario processi concettuali eterogenei che consentono di costruire oggetti del sapere e si riproducono mediante dispositivi istituzionalmente riconosciuti. La produzione di un sapere è inseparabile da pratiche di potere, siano esse coercitive, disciplinari, educative, terapeutiche etc., e dagli effetti della sua conseguente rivelazione al soggetto. Tuttavia, così come l'evoluzione del sapere è inseparabile dalle strutture del potere almeno per trovare un proprio efficace piano di sviluppo, allo stesso modo esso può eludere le conformazioni di controllo storicizzate e consolidate e seguire processi indipendenti, che poi magari confluiranno in forme di potere nuove e differenti. Queste formazioni discorsive fungono anche da paradigmi epistemologici che modificano i propri codici interpretativi della realtà con l'intensificazione dello sviluppo del sapere scientifico: dal Rinascimento al Novecento, per esempio, Foucault individua almeno tre macro-periodi in cui le rivoluzioni hanno condotto l'umanità in una crisi profondissima, per poi trovare strade verso un'autonoma fuoriuscita da essa. Cambiando a sua volta anche i meccanismi linguistici, semantici e ideali di declinazione della nuova realtà venuta a costituirsi.

Siamo di fronte a una nuova e inevitabile *episteme*, nella quale i mezzi tecnologici di ogni ordine e grado costituiscono i pezzi della nuova formazione discorsiva: l'intelligenza artificiale è un linguaggio sempre più olistico. La sfida però è la sua democratizzazione, ovvero il rinnovamento in senso democratico della conoscenza profonda che possiamo avere di essa, dei vizi e delle virtù, dei rischi e dei vantaggi del suo utilizzo. E da essa può dipendere anche lo stato di salute delle nostre democrazie proprio in questa fase di inquietudine, instabilità, incompiutezza che costantemente vivono.

AI agisce come tecnologia politica per niente neutrale e tale dimensioni non può essere astrattamente preventivata né risolta dalla sola etica filosofica. Essa è il risultato di operazioni tecniche concrete, come le somme su vettori, nel contesto di specifiche condizioni sociali.

Le reti neurali artificiali sono molto richieste perché la confluenza di grandi quantità di dati e la potenza con cui vengono elaborati ha permesso loro di produrre risultati sorprendenti in svariati settori. Tali reti affermano un ordine matematico nascosto nel mondo che almeno in apparenza risulta superiore all'esperienza diretta. La corsa per adottare gli arnesi dell'AI, però, è guidata dall'obiettivo di massimizzare l'efficienza o il valore del profitto. Le operazioni che inficiano in questa "intelligenza" agiscono in armonia con un neoliberismo che percepisce il mondo come un insieme atomizzato di input in un meccanismo di mercato che tende evidentemente al risultato più profittevole. Questo approccio traccia inevitabilmente i confini della decisione politica, in modo tale che l'Intelligenza Artificiale possa anche diventare un ulteriore agente di controllo. Le sue categorizzazioni innescano catene di decisioni umane e meccaniche con conseguenze reali e grazie alla sua sconfinata capacità di apprendimento, questi risultati numerici acquisiscono una forza pubblica simile a quella della legge senza avere la natura della legge. La competenza per contestare i calcoli della "ragione della macchina" nei loro termini è altamente centralizzata in alcune corporazioni oppure nelle ricerche universitarie, pertanto con evidenti limiti democratici, quantomeno nella facilità di divulgazione. Sebbene l'intelligenza artificiale si materializzi nell'anonimato delle aziende di server, la sua leva sta tra il pensiero e l'azione. Non è che le decisioni chiave siano delegate a macchine completamente prive di impulsi umani, ma gli individui a cui sono affidate tali decisioni raramente sono liberamente attrezzati a recepire critiche politiche. In questa direzione l'AI non dovrebbe essere applicata a campi di indagine sociali o culturale complessi, al di fuori di aspetti estremamente ristretti e limitati. Questo sia perché il suo modo di operare tende alla riduzione semplificata della stessa "realtà complessa", sia perché l'apprendimento profondo è letteralmente fuori dalla sua portata quando si tratta di multiformità sociale e politica, soprattutto se questa si presenta nella sua più disordinata conflittualità.

Le reti neurali funzionano bene nella classificazione di una stragrande quantità di oggetti della realtà, si pensi su tutte alle immagini per esempio, ma sono sono ancora lontane dal vero riconoscimento e nessuna di esse ha una comprensione profonda di qualsiasi cosa che si presenti sotto forma di modello astratto oppure ontologicamente

nuovo. Tuttavia, non poter scendere in profondità non è l'unico motivo per cui dovremmo tenere l'intelligenza artificiale lontano da situazioni socialmente sensibili. L'ottimizzazione mirata che sembra far coniugare così bene l'AI con una prospettiva neoliberista porta con sé un carico etico dirimente: attraverso reti neurali istituzionalizzate si sta applicando al mondo sociale una logica strettamente matematica. Un simile approccio etico ha prodotto tutta una serie di paradossi poco lusinghieri: l'apprendimento automatico talvolta viene applicato a problemi basati su presupposti non esaminati a fondo, come possono essere i pregiudizi culturali e gli obiettivi istituzionali, e quei pregiudizi più profondi che sono insiti nel linguaggio stesso. Problematizzare non significa semplicemente scoprire il problema, ma talvolta anche inventarlo. Per procedere in tal senso è possibile usare la medesima impalcatura concettuale che è stata utilizzata per costruire il problema, ma scoprirlo non può essere semplicemente una questione di deduzione probabilistica: la posta in gioco non è la probabilità dell'attuale AI, ma la possibilità del pensiero e dell'azione politica.

Anche coloro che desiderano sviluppare un apprendimento automatico purché non oppressivo non dovrebbero accettare un problema come dato, ma potrebbero iniziare. È necessario a questo punto pensare a rafforzare le posizioni alternative alle correnti politiche che enfatizzano acriticamente l'irreversibilità del presente modello di sviluppo delle intelligenze artificiali, o comunque il presente indirizzo all'interno di un paradigma economico più ampio. Le reti neurali potrebbero diventare motori di ingiustizia epistemica anche per l'eccessiva quanto fisiologica tensione alla semplificazione dei problemi sociali basata su ragionamenti ideologici riduttivi. Il fatto di sottolineare le incoerenze nelle affermazioni sull'AI non ha alcuna influenza su questa tendenza politica. Quindi l'avvio di pratiche collettive nell'utilizzo dell'intelligenza artificiale non è solo una necessità epistemologica, ma anche politica. Palesare con trasparenza le risorse disponibili e le conseguenze dei loro diversi impieghi potrebbe creare condizioni in cui le persone abbiano la capacità di agire autonomamente mediante processi meno controllati da altri, trovando e analizzando così le limitazioni appropriate per l'uso degli strumenti più nefasti. Limitare tali strumenti attraverso meccanismi collettivi produce automaticamente più spazi fisici di azione. Tuttavia, tali spazi non saranno dati

liberamente. Forme di resistenza saranno necessarie per crearli a partire proprio dai luoghi di lavoro, in particolare quelli privati, nei quali l'intelligenza artificiale viene programmata, ancor di più nei settori strategici di un Paese. Si tratterebbe di un meccanismo in potenza per trasformare in atto la costruzione della struttura di una società nuova.

Qualunque siano gli indirizzi per la ristrutturazione dell'AI, essi non potranno essere realizzati chiaramente senza un'effettiva interazione con le istituzioni politiche, proprio perché le reti neurali sono tecnologie intrinsecamente politiche che devono essere riconosciute come tali. Adottata senza vincoli, invece, l'intelligenza artificiale tenderà ad amplificare le ingiustizie in essere, o addirittura a diventare parte di un passaggio verso una normatività ulteriormente ambigua. Il rinnovamento delle prospettive con cui si utilizzano i mezzi dell'AI può condurre a una graduale distribuzione a discapito del potere già nelle mani dei soggetti egemonici e la creazione di strutture alternative di organizzazione sociale. Attraverso una rigenerazione del pensiero collettivo è possibile contrastare la mancanza di riflessione plurale (o quantomeno la mancanza di ascolto della pluralità di voci) con pratiche di solidarietà e cura pubblica in grado di contrastare certa irrazionalità del pensiero razionale artificiale. Nel pieno sonno ontico dello Stato come entità autonoma e collettiva, riflettere e studiare gli inediti strumenti rivoluzionari che l'umanità si trova a dover padroneggiare è dirimente per cementare i meccanismi della nuova convivenza civile. Il rischio che il "procedimento algoritmico", capace di ri-sostanziarsi continuamente e progredire come un insieme aperto di possibilità al proprio interno, diventi mezzo solo di pochi ritrovandosi a esser come una totalità chiusa all'esterno non è da escludere. La formazione di una nuova *episteme* di cui sono in elaborazione singoli termini e agglomerati discorsivi inediti è in fase di generazione incontrovertibile, ma ancora direzionabile eticamente e politicamente. Per questo scopo è necessario un intervento ampio e collegiale, una partecipazione pubblica senza precedenti; una ricerca collettiva, questa sì necessariamente olistica. E all'autorità degli Stati spetta il primo passo per uscire da una insufficiente marginalità.

Noi possiamo e dobbiamo procedere con gli studi, con le contaminazioni, con le valutazioni, con le proposte: il numero 1 del 2024 della Rivista di Studi Politici si propone di offrire alcuni saggi con otti-

che visuali e prospettiche altre, ma non per questo sconnesse tra loro. Anzi, proprio in linea con l'approfondimento epistemologico a cui ci obbliga questa nostra immediata contemporaneità, il presente volume si configura seguendo un'impostazione transdisciplinare, e prova a legare tra loro solo alcuni aspetti dell'attuale dibattito sull'Intelligenza Artificiale, nel tentativo di mostrare, seppur nei naturali limiti di economia testuale di un fascicolo, quanti spazi aperti sono ancora percorribili dalla ricerca.

L'articolo di apertura riguarda la relazione tra la filosofia e l'AI: Pasquale Grieco, infatti, nel suo *I01 – Between digital revolution and anthropology: crisis of the Subject and hybrid societies* si propone di affrontare il superamento della categoria di soggetto moderno influenzato da alcuni passaggi storici e svolte teoriche del pensiero computazionale. Il secondo contributo *AI and Human Leadership: Brief notes toward a new challenge for Business* di Paola Manes si sofferma, invece, sulla nuova costruzione normativa che l'Europa per prima ha imposto ai protagonisti del settore dell'AI, appuntando il ruolo delle imprese nella trasformazione digitale causata dall'adozione di sistemi di intelligenza artificiale e machine learning a supporto dei processi aziendali. Il terzo saggio del Focus dal titolo *Verso un'intelligenza democratica o una democrazia artificiale? Ambiente e profitti: spunti per una riflessione più complessiva* ad opera del sottoscritto Leonardo Masone e di Eléna Grobler, ci si interroga, a partire dal tema ambientale e in particolare modo agricolo, sulla questione democratica sempre rimandata e ancora una volta sull'assenza degli Stati nella dimensione dei rapporti tra imprese dell'AI e conoscenza pubblica. Con il quarto articolo abbiamo il piacere di ospitare Dan Mcquillan, studioso inglese che con il suo *Apprendimento automatico, salute mentale ed eugenetica* esamina come l'apprendimento automatico è destinato a essere profondamente coinvolto anche e soprattutto nella diagnosi della salute mentale. Seguendo un indirizzo tematico affine al precedente intervento, nel quinto saggio*, Variazioni etiche nel dialogo con Nao. Esplorazioni della moralità umana nell'interazione con i robot sociali*, Marta Vitale e Alessandro D'Oronzo riflettono sul rapporto tra interazione con robot sociali e dinamiche di disimpegno morale, in particolar modo proponendo una sperimentazione che indaghi l'eventuale differenza tra i risultati della compilazione del Moral Foun-

dation Questionnaire, sia nel caso di somministrazione da parte di un robot e sia di un umano. Nell'ultimo articolo del Focus, *Outlining a Protohistory of Artificial Intelligence and Music: From Antiquity to Nineteenth Century,* presentato da Ivano Zanzarella, viene delineata una protostoria dell'Intelligenza Artificiale in relazione alla strumentazione musicale (AIM), ovvero la storia dei sistemi per la composizione e l'esecuzione automatica della musica sviluppati prima dei computer digitali e dell'Intelligenza Artificiale.

Buona lettura!

FOCUS I01 – Between digital revolution and anthropology: crisis of the Subject and hybrid societies

Pasquale Grieco

1. Vampires and Information Technologies

The Contemporaneity shaped by digital technologies is not just the product of an enormously increased computational power, which, as the Moore's Law[1] seems to suggest, grows exponentially. This age, our age, named by Luciano Floridi the age of the *Fourth Revolution*[2], s marked by a dual sense of change (and it cannot be otherwise, because it is its feature of *duality* that qualifies its revolutionary character): an extroverted change, directed towards the world[3], and an introverted one, towards the individual.

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[1] The Moore's Law was formulated by Gordon Moore, co-founder of Intel, and states that «The complexity of a microcircuit, measured for example by the number of transistors per chip, doubles every 18 months (thus quadrupling every 3 years)» (G. Moore, *Cramming more components onto integrated circuits*, «Electronics», 38, 8, April 19, 1965, pp. 114-117).

Far from being a "law of nature", it represents a generalization indicating the exponential increase in computational power and the corresponding decrease in costs of the technology implementing it. Moore's Law has become the metaphysical basis for Ray Kurzweil's "faith". Kurzweil is an entrepreneur, inventor, and Google's Chief Engineer, relentless preacher of the advent of Technological Singularity and the possibilities of Transhumanism. See R. Kurzweil, *The Singularity Is Near: When Humans Transcend Biology*, Viking, New York 2005.

[2] L. Floridi, *The Fourth Revolution. How the Infosphere is Reshaping Human Reality*, Oxford University Press, Oxford 2014.

[3] Also noteworthy, even if I do not subscribing to them, are the physical, philosophical, and mathematical conceptions charachterizing the entire universe as a gigantic computer (digital or quantum), whose structure and primal matter would be formed or derived from the Bit (*It from Bit*) (K. Zuse, K*., Calculating Space*, MIT Press, Cambridge Massachusetts 1970; J.A. Wheeler, *Information, Physics, Quantum: The Search For Links*, «Proceedings of the 3rd International Symposium on

These changes produced, and they are still producing, a re-ontologisation and a re-epistemologisation of our ideas about modernity (world, subject, thought, nature, culture, action, community, and so on) that are requiring effective critical tools to be adequately conceptualized.

The use of certain methodological results from cultural anthropology and historical studies can be fruitful in this regard. These outputs can be applied in topics deeply relevant to the historical-scientific, ethical, and epistemological transformations associated with the spreading of the *Information and Communication Technologies* (ICT) and its theoretical background.

Exempla like the phenomenon of shamanism, its strict connection with the unconscious structures of the mind, and the "automatic" or "mechanic" nature felt by everyone during simple tasks such as stroking keys on a QWERTY keyboard [4], driving a car, or engaging in other

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the Foundations of Quantum Mechanics», Tokyo 1989, 354-368; E. Fredkin, *An Introduction to Digital Philosophy*, in «International Journal of Theoretical Physics» volume 42, pp. 189-247). For a quantum interpretation of the universe as a computer see S. Lloyd *Programming the Universe: A Quantum Computer Scientist Takes On the Cosmos*, Knopf, New York 2006). In this framework, according to a certain "ontologizing" characterization of the Church-Turing Thesis (which states that everything computable is computable by a Turing machine) computers would have an effective capacity for creation/transformation, writing/rewriting of the Universe. These theses also underpin much of the Simulation theories, suggesting that we might be living in a gigantic virtual simulation, or at least lacking any conclusive proof to distinguish a "real" reality from a simulated one. See D. Chalmers, *The Matrix as Metaphysics*, *thematrix.com*; reprinted in Christopher Grau, ed., *Philosophers Explore the Matrix*, Oxford University Press, Oxford 2005, pp. 132-76, and D. Chalmers, *Reality+. Virtual Worlds And The Problems Of Philosophy*, W.W. Norton & Company, New York 2002; N. Bostrom, *Are we living in a computer simulation?*, in «Philosophical Quarterly», 53, 211, 2003, pp. 243-255. For a philosophical overview on the theme of the informational conception of physics see D. Chalmers, *Reality+*, cit., pp. 148-160). For a critique of the above-described digital ontology, in favor, instead, of a defence of an informational structural realism, see L. Floridi, *The Philosophy of Information*, Oxford University Press, Oxford 2011 pp. 316-328.

[4] The QWERTY keyboard is a good example of automatic knowledge interiorized by the body. Touchtyping is an «incorporating practice», an action that is encoded into bodily memory by repeated performances until it becomes an habit. T. Bardini, *Bootstrapping: Douglas Engelbart, Coevolution, and the Origins of Personal Computing*, Stanford University Press, Stanford 2000, p. 67. Doug Engelbart, the

routine activities, are not connected merely by chance. These instances can be observed in the historical development of human-machine interactions.

It is not accidental either that there is a relationship between the typical shamanic alteration of states of consciousness, induced by drugs or other environmental causes, and the historical role played by LSD as a form of "liberation of the mind"—with the mind considered cybernetically as an information processing system—in the development of the contemporary shape of our personal devices and digital and Internet technologies[5].

Among the traditional categories that the contemporaneity requires to put under critical lens, particularly urgent is analysis of the Subject. What we call Self, with its set of quintessential features (simplicity, self-trasparency, rationality and so on), is maybe just a cultural construct of a particular period of the intellectual history: the Modernity. The digital revolution is a further step toward the crisis of this construct. Applying anthropological and historical analyses is helpful

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man whose vision has shaped the contemporary personal human-computer interface attempted, instead, to develop tools capable of augmenting the automatic bodily (and mental) capabilities of the user. Cfr. Ivi, pp. 58-80.

[5] In the development of augmenting interfaces, there is an instance red thread in the history of informational, cybernetic and computing thought that aims at the automatization of lower/automatic function of mind activity in order of freeing up higher-level ones. Cfr. Ivi, p. 19. Doug Engelbart, as many of the artificial intelligence and personal computing pioneers, experimented with LSD. S.A. Kallen, *The Information Revolution*, Lucent Books, Farmington Hills MI 2010, p. 32. On the role of the LSD and other psychedelic drugs, included peyote and hallucinogenic mushrooms used in shamanic rituals, in the biographical and intellectual events of computer revolution main protagonists, included Steve Jobs, see. J. Markoff, *What the Dormouse Said: How the Sixties Counterculture Shaped the Personal Computer Industry*, Penguin Books, New York 2005. The role of counterculture as of "primordial soup" for the developing of digital culture is analyzed in F. Turner. *From Counterculture to Cyberculture, Stewart Brand, the Whole Earth Network, and the Rise of Digital Utopianism*, University of Chicago Press, Chicago, 2008. Steward Brand, the founder of fundamental for both cultures *Whole Earth Catalog*, in a seminal article *Spacewar* on *Rolling Stone* drew a direct inheritance between psychedelics and information technologies: «Ready or not, computers are coming to the people. That's good news, maybe the best since psychedelics». Brand describes also the hackers as direct heir of the hippies. S. Brand, *Spacewar*, in «*Rolling Stone*», 07/12/1972.

to find seeds of this crisis in the heart of the concrete development of the category of the Self and his features. The critique has profound consequences for the concepts of the moral agency that affects the political sphere. Who are the citizens, and who is accountable for his actions in our globalized and technological democracies? A particularly useful example of in these matters, alongside another study on the phenomenon of possession, better analyzed below, are the research carried out in the book *Vampyr. Storia naturale della resurrezione*[6] by F.P. De Ceglia, a study focused on the origins of the belief in vampirism, tracing its genealogy up to the events related to the dissemination of the news by newspapers of the time that, on Christmas of 1731, the dead had risen and decided "to wage war" on the living.

The analysis of this episode of "natural history" of the European Modernity revealed an intertwining of phenomena that are far from being anthropologically "neutral" or simply relegable to folklore. At the heart of the belief in vampires there are religious-cultural[5] and political-economic issues; ways of sociality modalities; climatic conditions (the long periods of frost characterizing the seasonal cycles in the countries where the vampirism epidemic originated) and ancestral worldviews and explanations of natural phenomena (the *vukodlaci* wolves chasing clouds in the sky)[7]. These ideas were widespread not only among the rural or poorer strata of the population but they also found fertile ground for their dissemination in the philosophical, theological, and scientific culture of the time and had deep political effects.

The analysis of vampirism – and the blurring of conceptual dichotomies taken for granted, such as life/death, human/non-human, mechanistic/animated, natural/unnatural, etc. – shows how the categories of modern philosophy, *in primis* the Self, need to be radically questioned. There is a fracture in the Modern Subject: monolithic and individual, unique and identical to itself, understood as a Cartesian thinking substance, ontologically hypostatized and separated from the world – or as a transcendental "I"

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[6] F.P De Ceglia, *Vampyr. Storia naturale della resurrezione*, Einaudi, Torino 2023.
[7] Cfr. Ivi, Ch. 5.

that gazes upon the world as a «judge of the real and the valid»[8]. This fracture opens up a conceptual space for a fruitful contamination of methods and objects between philosophical reflection on *Information*[9] and fields of inquiry that might initially seem alien to it, but only in the case of an exclusively "engineering" approach to ICT technologies that neglets their intimate sociotechnical nature. Historical and socio-anthropological disciplines are essential to develop the ontological and epistemological rethinking that the digital revolution entails, as will be briefly illustrated in some thematic points throughout this work.

In the horizon of the digital revolution, an additional step is taken towards the crisis of modern subjectivity. This crisis is one of the keys to understanding the philosophical, socio-anthropological, ethical, and political consequences of the transformation due to ICT in their full "revolutionary" scope. The impact changes the status and response to questions such as: "What is the *τί ἐστί* of Man?"; "Who or what holds rights and duties, who or what is a moral agent or patient?"; "Who or what forms a social collective?" After the Fourth Revolution, it is no longer possible to pose these questions, nor to answer them, in the same way as the Moderns did.

2. Algorithms as Cultural Machines

Is necessary, at the macro-level of analysis, considerate the never neutral nature of the algorithm. Algorithms are cultural machines[10]. They incorporate, convey, multiply, and implement structures and practices of power, desire and reproduction of economic and political interests. They are based on and feed off the *symbol-language-magical thought* nexus in an interactive relationship between deep anthropological in-

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[8] «Il soggetto pensante che giudica ciò che è reale e valido» (P. Pecere, *Il dio che danza. Viaggi, trance, trasformazioni*, Nottetempo, Milano, 2021, p. 73).

[9] Here the term "Information" is used as an umbrella term to indicate cyber-philosophy, digital philosophy, computational philosophy, AI philosophy and so on.

[10] E. Finn, *What Algorithms Want: Imagination in the Age of Computing*, MIT Press, Cambridge Massachusetts 2017, p. 26.

stances and our cognitive structures[11]. «From its bones in set theory and symbolic logic to the latest articulations of datadriven machine learning, computation casts a cultural shadow that is informed by this long tradition of magical thinking»[12]. The digital is a *weltanschauung*[13], as its theoretical antecedent is: the computational thought. It is no a coincidence that the "grandfather" of AI was Thomas Hobbes[14], who in the Leviathan proposed the first definition of thought as calculation[15]. Hobbes bases his entire political and scientific theory on

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[11] A fascinating analysis of this relationship is found in the 1992 cyberpunk cult novel *Snow Crash* by Neal Stephenson, the first novel in which the word "*Metaverse*" appears. See, Finn, *What Algorithms Want*, cit., Chapter I. The relationship between symbol, syntax, and reality is also the theme of the long-standing problem of the Philosophy of Information (L.Floridi, «*Is semantic information meaningful data?,* «Philosophy and Phenomenological Research», 70, 2005, pp. 351-370), the *Symbol Grounding Problem* (S. Harnad, *The Symbol Grounding Problem*, «Physica», 42, 1990, pp. 335-346), which concerns how symbols used by a cognitive system can acquire meaning connected to the external world without necessarily «parasitizing» it from our mind.

[12] E. Finn, *What Algorithms Want*, cit., p. 2.

[13] For a passionate critique of the world view conveyed by the digital, in line with the seminal work of Weizenbaum, (J. Weizenbaum, *Computer Power and Human Reason: From Judgment To Calculation. Freeman*, San Francisco 1976), more significant because it comes from a pioneer of the computer revolution, see J. Lanier, *You are not a gadget: A Manifesto*, A. Knopf, New York 2010.

[14] Cfr. J. Haugeland, *Artificial Intelligence: The Very Idea*, MIT Press, Cambridge-Massachusetts 1985, p. 23.

[15] «When a man reasoneth, he does nothing else but conceive a sum total, from addition of parcels; or conceive a remainder, from subtraction of one sum from another: which (if it be done by words,) is conceiving of the consequence from the names of all the parts, to the name of the whole; or from the names of the whole and one art, to the name of the other part». T. Hobbes*, Leviathan or The Matter, Forme and Power of a Common Wealth Ecclesiastical and Civil Edited with an Introduction and Notes by C. A. Gaskin, Oxford University Press, Oxford 1996*, Book I, chap. V, p. 18 orig.The English philosopher one of the two distinguished thinkers – together with Boyle – who gives the name to the fundamental work of Shapin and Schaffer, *The Leviathan and the Air Pump*, is constructed, which thematizes and investigates the never neutral nature of the scientific enterprise. Knowledge and political dimension, for the two authors, are never separate or independent issues. «Knowledge, as much as the state, is the product of human actions. Hobbes was right». S. Shapin, S. Scheffer, *Leviathan and the Air-Pump: Hobbes, Boyle, and the Experimental Life*, Princeton University Press, Princeton NJ 1985, p. 344.

mathematical demonstration. In the *par excellence* work about Power, the computational power is a form of power. Hobbes structures his entire political and scientific theory on mathematical demonstration. Anthropological reflection on science can find here fertile ground to thematise the political nature of computation. Bruno Latour's words are illuminating:

> He arrives at all his scientific results not by opinion, observation or revelation but by a mathematical demonstration, the only method of argument capable of compelling everyone's assent; and he accomplishes this demonstration not by making transcendental calculations, like Plato's King, but by using apurely computational instrument, the Mechanical Brain, a computerbefore its time. Even the famous social contract is only the sum of a calculation reached abruptly and simultaneously by all the terrorized citizens who are seeking to liberate themselves from the state of nature[16].

Without delving into the ontological interpretations of *Hypercomputation* (see *supra* in note), the algorithmic thought, from what G. Dyson has named *the Turing's Cathedral*[17]*,* sanctions and conveys the computationalist vision: «Algorithmic thinking encodes the computationalist vision, the maximalist idea that all complex systems will eventually be made equivalent through computational representation»[18]. The power of cut and paste in the digital realm allows us to cut and re-paste our reality and our ideas about Modernity[19] creating, recreating, or revealing entities made of both nature and culture denied by it. In this process, in the Fourth Revolution, the fiction of a clear separation and opposition – and in this fiction lies the fundamental trait of the modern age – between the world and man, between nature and culture, collapses, revealing the presence of *hybrids* and allowing their conceptualisation.

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[16] B. Latour, *We have never been modern*, Harvard University Press, Cambridge 1993, p. 19.

[17] G. Dyson, *Turing's Cathedral: The Origins of the Digital Universe*, Vintage Books, New York 2012, chapter 13.

[18] E. Finn, *What Algorithms Want*, cit., p. 43.

[19] L. Floridi, *The Ethics of Artificial Intelligence. Principles, Challenges and Opportunities*, Oxford University Press, Oxford 2023, p. 4.

3. There Is a Revolution. Who Is The Revolutionary?

The very concept of the Fourth Revolution, structured and nourished by the computational power outlined above, challenges the idea of subjectivity inherited from modernity. The revolution led by Alan Turing – following Copernicus, Darwin, and Freud, symbols of previous revolutions[20] - marks another step in the process of rethinking by humans about the world and themselves. Gradually, Man is no longer at the centre of Creation (*1st Revolution*); he is no longer the pinnacle, unnaturally separate, of the living nature (*2nd Revolution*); he is no longer Cartesian clear, univocal, and self-transparent thought (*3rd Revolution*). Turing's man, finally, must renounce the primacy/monopoly on information processing[21] and intelligent action. He must

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[20] Cfr L. Floridi, *The Fourth Revolution. How the Infosphere is Reshaping Human Reality*, Oxford University Press, Oxford 2014, pp. 87-94.

[21] For information here does not mean Shannon's Information. Shannon's information is quantitative, free from the semantic dimension that it can assume, understood in relation to the measurement of the entropy and uncertainty of a message and it can be expressed with the average logarithm of the message's improbability; formalized as: $H = - \Sigma\, pj\, log2\, pj$ (H = amount of information, *the entropy*; Σ =the sum over all messages j; pj = probability of message j) a formula that represents a decisive step forward compared to Hartley's "classic" $H = n \log s$ (s = number of possible symbols, n = number of transmitted symbols). (see R. Hartley, *Trasmission of informations*, «Bell Sistem Technical Journal» (July) 7 1928, pp. 535-563; C.E. Shannon, *A Mathematical Theory of Communication*, «Bell System Technical Journal», Vol. 27, 1948. pp. 379-423, 623-656. An effective and non-technical introduction can be found in J. Gleick, *The Information: A History, a Theory, a Flood*, Pantheon Books, New York 2001, for an overview of the concept of information see P. Adriaans, P. *Information*, in *Stanford Encyclopedia of Philosophy*, 2012/2020. The information taken into account here is semantic information, in its "strong" sense. Considered: SDI (standard definition of information); DOS (declarative, objective, semantic); σ (*infon*) = symbol used to refer to discrete elements of information, regardless of their semiotic code and physical implementation; δ = data not alethically qualified, well formed and endowed with meaning: Strong semantic information in the sense (RSDI) will thus be defined: RSDI) σ is an instance of DOS information if and only if: 1. σ consists of n data (d), for $n \geq 1$; 2. the data are well formed (wfd); 3. the wfd are meaningful (mwfd = δ); 4. the δ are truthful. (L. Floridi, *The Philosophy of Information*, cit., pp. 83-83; criticized in M.T. Ferguson, *Two paradoxes of semantic information*, «Synthese» 192(11), pp. 3719-3730. and in B. Lundgren, *Does semantic information need to be truthful?,* «Synthese» Vol. 196, No. 7, Special Issue on Between First- and Second-Order Logic July 2019, pp. 2885-2906.

share the world and the infosphere with technologies, the ICTs, capable of supporting or even replacing him in complex[21] activities. Activities that have historically been considered exclusively human prerogatives. *Homo Sapiens*, through ICT, also discovers himself as an "*Inforg*", an informational organism, living "*Onlife*" (without a discontinuity between online and offline) in a "*hyper-historical*"[22] society – socially and individually dependent largely on ICT – where digital technologies become technologies of the Self, capable of constructing, shaping, transforming, and reconfiguring our personal identity[23].

The gap from the ontological hypostatisation of the Cartesian *res cogitans* or the Kantian transcendental *a priori* could not be more profound. ICT highlight the nature of the Self as a Multi-Agent System (MAS), constituted by different dimensions/membranes (bodily, cognitive, and conscious) interacting and influencing each other in a poietic process[24]. In the *Phaedrus*, Plato had already characterized the nature of the Self as at least tripartite with the famous metaphor of the charioteer and the two horses [25]. Digital technologies solve the problems posed by recognizing the non-substantial, non-univocal, and non- diachronically stable nature of the Self, as pointed out by empiricist philosophers like John Locke and David Hume in their cri-

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[22] L. Floridi, *The Fourth Revolution*, cit., p. 94.

[23] Cfr. Ivi, Chapter I, pp. 59-68, 94-96.

[24] Id., *The Informational Nature of Personal Identity,* «Minds and Machines», 21, 4/2011, pp. 549-566.

[25] «In my analogy, a soul is like an organic whole made up of a charioteer and his team of horses. Now, while the horses and charioteers of gods are always thoroughly good, those of everyone else are b a mixture. Although our inner ruler drives a pair of horses, only one of his horses is thoroughly noble and good, while the other is thoroughly the opposite. This inevitably makes driving, in our case, difficult and disagreeable» (Plato, *Phaedrus*, 246a-b; translated with an Introduction and Notes by R.Waterfield, Oxford University Press, Oxford 2003, p. 28. From an informational standpoint, the Platonic analogy could be seen as a technological analysis of a multi-agent system (MAS), where the issue concerns the relationship among the three parts. This poses questions about continuity, coordination, and the unity of the MAS. This might suggest that even the chariot itself, in its functional parts, could be considered as the fourth element of the Platonic self-system, as it is what holds together and coordinates the various subunits. L. Floridi, *The Informational Nature of Personal Identity*, cit.

tique of the subject as *res cogitans*. The Self that emerges from informational analysis is neither a substance separated from the world nor a mere *a priori* epistemic function guaranteeing the objectivity of sensations. The subject, and its identity, far from being always unique and identical to themselves, are constructed and produced in relation to the world and other selves, each as designers of narratives continually externalized and related to other selves, in an interactive relationship that ICT amplifies and deepens enormously.

4. Intelligence: Imitation, Behaviour, Function

The birth act of AI – the famous *Proposal for the Dartmouth Summer Research Project on Artificial Intelligence* organized by John McCarthy, with the participation of Minsky, Rochester, Shannon, Simon, Newell et al. – establishes Artificial Intelligence as a counterfactual: «For the present purpose the artificial intelligence problem is taken to be that of making a machine behave in ways that would be called intelligent if a human were so behaving»[26]. The first "cry" of AI – or rather the first in which the name *Artificial Intelligence* appears – does not define Artificial Intelligence, nor does it indicate how to recreate it, in whole or in part, at a human level, but rather defines a behaviour[27].

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[26] J. McCarthy, M. Minsky, et al., *A Proposal for the Dartmouth Summer Research Project on Artificial Intelligence*, «AI magazine», n. 27, August 31, 1955. For the analysis of AI as counterfactual, L. Floridi, *The Ethics of Artificial Intelligence*, cit., pp. 16-20.

[27] The history of AI as a science is structured around this problem. Both in terms of its development as a science - the succession of Winters and Summers (increase or decrease in interest, public and private funding, public relevance of AI) demonstrating the fallacy of an internalist approach to this discipline - and from the perspective of research paradigms (strong/weak AI; engineering/production AI; symbolic/subsymbolic AI) and also at the level of theoretical approach, based on Thought or Behavior, Rationalist/Human-centric. Cfr. M. Mitchell, *Artificial Intelligence: A Guide for Thinking Humans* (First ed.). Farrar, Straus and Giroux, New York 2019, Part I; S. Russell, P, Norvig, *Artificial Intelligence. A Modern Approach* (Fourth Edition), Pearson, London 2021, Ch. 1.1.

Intelligence is behaviour. The digital subject, is a multi-agent system of interactive behaviours with each other and with the environment (the world, or rather the *Infosphere*) in a co-constitutive relationship of multiple identities, themselves subject to the technological shaping power of ICT. Without delving further into the subject, the counterfactual nature of the AI definition by its "godfathers" already marks a profound departure from the traditional conception of agency, which was traditionally ascribed only to the human subject. Machines could also act and could do so like humans. The Dartmouth definition pairs with the definition of the *Imitation Game*, the so-called *Turing Test*[28], proposed by Alan Turing in the 1950 in his classic paper *Computing Machinery and Intelligence*[29]. The English mathematician states regarding the question: «Can machines think?», «I believe this question to be too meaningless to deserve discussion». Using a popular role-playing game

[28] Unfortunately, it is not possible here to critically discuss Turing's famous proposal and the vast literature on it. For a general overview – from the 1950 proposal of the Imitation Game to the recent editions of the Loebner Prize at the University of Reading (an annual chatbot contest competing to achieve the highest score in the Turing Test) – and a discussion of criticisms (such as the famous ones from Searle's Chinese room or Ned Block's blockhead), see G. Oppy, D. Dowe, *The Turing Test*, in *Stanford Encyclopedia of Philosophy*, 2003/2021. An effective philosophical examination is found in J.H. Moor, *An Analysis Of the Turing Test*, «Philosophical Studies», 30, 1976, pp. 249 257 and J.H. Moor, *The Status and Future of the Turing Test*, «Minds and Machines», 11, 2001, pp. 77-93. A detailed critique of the inefficacy of the Turing test as an effective test to discriminate the presumed intelligence of machines, and the need to replace it with others (related to semantic dimension, understanding of contexts and common sense, or the ability of detachment) more effective given the technological development of new chatbots and LLMs is found in Larsson 2021. E.J. Larsson, *The Myth of Artificial Intelligence: Why Computers Can't Think the Way We Do*, Harvard University Press, Cambridge 2021, Chapter 5, 13. It's mandatory to mention the *Voight-Kampff Test*, based on empathic ability, developed by Philip K. Dick in his 1968 science fiction work *Do Androids Dream of Electric Sheep?* which inspired Ridley Scott's 1982 film *Blade Runner*. Moreover, each of us, probably several times a day, undergoes a Turing Test, in which, paradoxically, the machine judges our humanity, when it encounters the now familiar screen containing a *CAPTCHA* (Completely Automated Public Turing test to tell Computers and Humans Apart). To date, CAPTCHA is an insurmountable task for machines, even for the most advanced AI models.

[29] A.M. Turing, *Computing Machinery and Intelligence*, «Mind», 59, 236, Oct. 1950, pp. 433-460.

of the time – involving three participants, A (Man), B (Woman), and C (Judge), who is separated from the other two and must determine who is the man and who is the woman through simple written questions and answers – Turing reformulates the "meaningless" question about machine thinking into a verifiable scientific hypothesis: «Can a machine participate in the Imitation Game?»[30]. If the machine deceives C, it should be attributed intelligence.

The boundaries between machine and man blur and become a function of the machine's ability to produce an action that can be understood as intelligent by a human being. There is no longer anything of the typical characteristics of modern subjectivity (and, along with it, agency). The distance from Descartes could not be greater[31]. Strictly

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[30] Ivi.

[31] Ironically, the Turing test has been called a "Cartesian" test. In both the *Discourse on Method* and the *Meditations*, there are precedents of the Imitation Game with mentioning: «At this point I had dwelt on this issue to show that if there were such machines having the organs and outward shape of a monkey or any other irrational animal, we would have no means of knowing that they were not of exactly the same nature as these animals, whereas, if any such machines resembled us in body and imitated our actions insofar as this was practically possible, we should still have two very certain means of recognizing that they were not, for all that, real human beings. The first is that they would never be able to use words or other signs by composing them as we do to declare our thoughts to others. For we can well conceive of a machine made in such a way that it emits words, and even utters them about bodily actions which bring about some corresponding change in its organs (if, for example, we touch it on a given spot, it will ask what we want of it; or if we touch it somewhere else, it will cry out that we are hurting it, and so on); but it is not conceivable that it should put these words in different orders to correspond to the meaning of things said in its presence, as even the most dull-witted of men can do. And the second means is that, although such machines might do many things as well or even better than any of us, they would inevitably fail to do some others, by which we would discover that they did not act consciously, but only because their organs were disposed in a certain way. For, whereas reason is a universal instrument which can operate in all sorts of situations, their organs have to have a particular disposition for each particular action, from which it follows that it is practically impossible for there to be enough different organs in a machine to cause it to act in all of life's occurrences in the same way that our reason causes us to act», R. Descartes, *Discourse on Method*. Part V, in *A Discourse on Method*, translated by I. McLean, Oxford University Press, Oxford 2006, pp. 46-47. The second place is in the *Second Meditation*: «from this I would have immediately concluded that I therefore knew the wax by

speaking – and not only retrospectively, since *General Artificial Intelligence* (AGI) is a far-off goal today, despite machines performing various activities that, from a certain perspective, can be considered intelligent or even creative (consider *Large Language Models* (LLM) like ChatGPT or image-generating AIs[32] like Midjourney or DALL-E) – following Turing, to produce an intelligent action, thought is no longer necessary. Nor is any specific physical or organic materiality. Turing and his machines are a powerful vector for the idea that the mind is software and the brain nothing more than one of its possible hardwares. This idea developed into the philosophy of mind school of thought known as *Functionalism*, the theory according to which mental states are computational states, expressible in terms of formal rules for the manipulation of symbols. They express nothing more than functions. Therefore, they can be implemented by any system, including a digital machine, if that has the right characteristics.

5. Subject/Subjects: a Society, a Network

It is useful to point out – considered the bidirectional relationship explanandum/explanans between Artificial Intelligence and Models of

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the sight of my eyes, not by the inspection of the mind alone-if I had not happened to glance out of the window at people walking along the street. Using the customary expression, I say that I "see" them, just as I 'see' the wax. But what do I actually see other than hats and coats, which could be covering automata? But I judge that they are people. And therefore what I thought I saw with my eyes, I in fact grasp only by the faculty of judging that is in my mind», Descartes, *Meditations on First Philosophy*, *Second Meditation*, p. 32, in *Meditations on First Philosophy With Selections from the Objections and Replies*, Translated with an Introduction and Notes by M. Moriarty, Oxford University Press, Oxford 2008, p. 23. It should be noted that in Calculating Machines and Intelligence, Turing addressing possible objections to the Imitation Game, tackels philosophical topics of great philosophical importance such as: the dualism of substance; solipsism; biological/cultural determinism; self-awareness. Cfr. A.M. Turing, *Computing Machinery and Intelligence*, cit..

[32] Briefly, A Large Language Model (LLM) is an artificial intelligence – or, better term a computational statistical algorithm self-supervised or semi- supervised – system trained on extensive text datasets to understand and generate human-like language. Generative AI refers to artificial intelligence systems designed to create new content, such as text, images, or music, by learning patterns from existing data.

the Mind – that within the computationalist thought itself arise a fracture of the subject's unity. Marvin Minsky, a pioneer of AI, explicitly speaks of *Society of Mind*[33]. Once that is established equivalence "mind = brain", for Minsky there would be a myriad of agents that are mindless, but from whose 'social' interaction the mind would result. The relationship between these agents parts of the mind «is sometimes one of cooperation, but more often of conflict»[34]. The consequence is that human intelligence, consciousness, and mind are not reducible to a single and simple principle. On the contrary, far from there being «magical tricks»[35]. The power of intelligence derives from our vast diversity, not from a single perfect principle. At the very heart of consciousness, understood computationally, there is a decisive feature of fragmentation.

Similarly, considering the mind as the ability to manipulate symbols through rules – a fundamental definition of the symbolic approach to artificial intelligence, as Haugeland does concerning GOFAI (*Good Old-Fashioned Artificial Intelligence*)[36] – one encounters the «paradox of mechanical reason»[37]. The presence of an intelligent, not merely mechanical, *homunculus* manipulating symbols necessarily implies, and here lies the nature of the paradox, an infinite regressive multiplication of *homunculi* manipulating symbols.

It is beyond the scope of this paper to further analyse this paradox. But it should be noted how the computationalist theory itself infinitely multiplies the population within the mind. The difference with the modern consideration of subjectivity, identity, and consciousness

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[33] M. Minsky, *The Society of Mind*, Simon & Schuster, New York 1985.

[34] «II cervello umano è una vasta società organizzata, composta di molte parti diverse. Dentro il cranio dell'uomo sono stipati centinaia di tipi diversi di motori e organizzazioni, meravigliosi sistemi evolutisi e accumulatisi nel corso di centinaia di milioni di anni. Alcuni di questi sistemi, ad esempio le parti del cervello che ci fanno respirare, funzionano in modo pressoché indipendente. Ma nella maggioranza dei casi queste parti di mente devono convivere con le altre, in un rapporto che è a volte di collaborazione, ma più spesso di conflitto». M. Minsky, *Prefazione all'edizione italiana*, in *La società della mente*, Adelphi, Milano 1989, p. 20.

[35] M. Minsky, *The Society of Mind*, cit., p. 308. «What magical trick makes us intelligent? The trick is that there is no trick».

[36] J. Haugeland, *The Artificial Intelligence*, cit., p. 112.

[37] Cfr. Ivi, pp. 36-44.

sharpens further if one briefly considers the subsymbolic paradigm of AI and its corresponding theory of mind, *Connectionism*. These are founded on the dimension of mental operations (e.g., perception) that lie below the level of logical-symbolic functions (e.g., the semantics of language). Considering the cardinal concept of this paradigm, *Artificial Neural Networks* (ANN) – an explanatory model of the mind and a key to the astounding success of Machine Learning (ML) and Deep Learning (DL)[38] – despite the recognizable importance of inductive

[38] Unfortunately, it is not possible to delve further into the concepts underlying the Machine Learning revolution here. ML is founded on the insights of Rosenblatt's Perceptron (F. Rosenblatt, *The Perceptron: A Probabilistic Model for Information Storage and Organization in the Brain*, «Cornell Aeronautical Laboratory, Psychological Review», v65, No. 6 1958, pp. 386– 408), refuted by Minsky and Papert (M. Minsky, S. Papert, *Perceptrons*, MIT Press, Cambridge, MA 1969) an event that stalled research on neural networks for many years. Key milestones in the resurgence of this research program (whose success is evidenced by the fact that in public discourse now AI and ML/DL are used synonymously) have been research on *Parallel Distributed Processing* Neural Networks (PDP) (J.L. McClelland, D.E. Rumelhardt PDP Research Group (1986) *Parallel Distributed Processing. Explorations in the Microstructure of Cognition*, 2, 216-271) (which in turn opened the way to the study of parallel functioning of human brain structures) and the spectacular victory of the ML algorithm *AlphaGo* in 2016 against the Go champion Lee Sedol (an event that surpasses in historical-technological importance even the victory of *Deep Blue* against Kasparov in 1997). On Connectionism as a branch of philosophy of mind that uses Artificial Neural Networks as an explanatory model, see C. Stinson, *Explanation and connectionist models* and C. Buckner, &J. Garson J. (2018*), Connectionism and post-connectionist* models in M. Spreveak, M. Colombo, *The Routledge Handbook Of The Computational Mind*, Routledge, Londra, pp. 120-133, 76-90; P. Smolensky, *On the proper treatment of connectionism*, in «Behavioral and Brain Sciences», vol. 11, Cambridge University Press, Cambridge 1989. For an overview of ML and DL, see M. Domingos, *The Master Algorithm. How the Quest for the Ultimate Learning Machine Will Remake Our World*, Basic Books, New York 2015 (although inspired by an almost "messianic" confidence in the potential of machine learning); M. Mitchell, *Artificial Intelligence*, cit., Ch. II and VI. Kai-Fu Lee and Chen Quifan offer a suggestive explanation of DL alongside a realistic science fiction narrative. Kai-Fu Lee, Chen Quifan *AI 2041. Ten Visions for Our Future*, Penguin, New York 2201, Ch. I. The treatment in S. Russell, P, Norvig, (2021), *Artificial Intelligence*, cit., Ch. V is more technical. An effective critique of the issues with ML/DL is in G. Marcus, *Deep Learning: A Critical Appraisal,* arXiv, January 2, 2018. On algorithmic black boxes, also from a socio-political and legal standpoint, see F. Pasquale, *The Black Box Society The Secret Algorithms That Control Money and Information*, Harvard University Press, Cambridge Massachussetts 2015.

inference, the processes leading to intelligent output or the identification of patterns from input data are by definition unknowable. They occur in the black box of nodes's convolution at different levels in the hidden layers of neural networks.

The astonishing successes of Machine Learning strike a further blow to one of the major claims of the modern subject: its supposed self-transparency and simplicity.

6. The "I": a Breathe?

The impact of digital technology and the recognition of the informational nature of human identity revitalize contemporary discussions around certain topics that crystallise ancient hopes or ancestral fears[39]

[39] Contemporary fears about potential *Existential Risks* (X-Risks) to the human species due to superintelligent AI (the one described in N. Bostrom, S*uperintelligence. Paths, Dangers, Strategies*, Oxford University Press, Oxford 2014) - exemplified by the now famous *Pause Giant AI Experiments: An Open Letter* from March 2023 by the *Future of Life Institute* (and signed for various reasons by many representatives, researchers, academics, and entrepreneurs from the AI world) - converge with what is the latest philosophy *à la mode* in Silicon Valley: *Longtermism*. Based on *Effective Altruism* (using scientific evidence and reason to understand and act on how to maximize benefits for others, maximizing the quantity of good, e.g., through rigorous cost-benefit scientific analysis), Longtermism asserts that the most important determinant of the value of our actions today is how these actions – which must quantitatively maximize. Positive consequences for human beings – influence the long/very long-term future. Helping wealthy nations, which know how to better use resources, rather than poor ones, is more important from a longtermist perspective. Avoiding the X-Risk of a super-AI in a remote future is more important than fighting climate change or AIDS today. Consuming Earth's resources so that the galaxy is colonized by trillions of human beings for longtermists is an ethically sustainable option. The main texts that underpin the longtermist view, which is gathered in think tanks like the *Future of Life Institute* or in universities like Oxford - and which also holds important advisory positions in the highest global political bodies - are W. MacAskill, *What we owe the Future*, Basic Books, New York 2022; T. Ord, *The Precipice: Existential Risk and the Future of Humanity*, Bloomsbury, Londra 2020; M Tegmark, *Life 3.0. Being Human in the Age of Artificial Intelligence* Knopf, New York 2017. An effective critique, which also collects the most disconcerting statements of longtermists, is E. P. Torres, *Against Longtermism*, in «Aeon», 19 October 2021. Curiously, these futuristic theories bear a resemblance to one of the more "modern" traditions of philosophical

(these topics can be examinated, cause their very nature, by the anthropological disciplines). These include the possibility of enhancing the physical/intellectual capabilities of human beings (e.g., *Transhumanism*[40]) or even achieving immortality (through the upload of consciousness into natural or artificial physical supports different from the original human body)[41].

These theoretical perspectives once again demonstrate how the Subject, an heir to philosophical modernity, is being radically questioned. They highlight, by now unsurprising, a "family resemblance" between the points examined and instances of conceptualizations of the Subject, as claimed above, that we can found in instances of anthropological and historical studies If the analysis of vampirism[42] shows the crisis of modern subjectivity, the same does the one about the theme of *possession*.

Both these studies deal with anthropological entities vastly different from those postulated by doctrines of the "Modern" Man. They reveal the inherently "unnatural" character of this concept and its essential peculiarities: the indivisible substantial or functional unity of the individual and its role as a structuring instance of the world. «It is indeed appropriate to remember how 'unnatural' and largely confined to the centuries of the ancient régime is the idea of a monolithic individual consciousness: a narrative centre of gravity»[43].

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thought, good old utilitarianism. From this genealogy, it is easy to understand the economic interests lying behind Longtermism.

[40] A sharp and detailed critical overview of the fallacies of transhumanism is the provided in L. Dibattista*, La filosofia di Altered Carbon, ovvero: le fallacie del Transumanesimo*, «Idee in form@zione», 2024, pp. 19-35.

[41] It is interesting to note how, apart from the plausibility of these options in a radical functionalist perspective, the descent of these theses from the "classic" considerations of criticism of the Cartesian substantial subject such as those contained in Locke's *Essay on Human Understanding*, in his famous thought experiments about personal identity, consciousness, qualitative identity, and memory.

[42] Is remarkable the impact that journalistic reconstructions have had on this matter, as an example of the power of information technologies even in "analog" form, such as a daily newspaper or magazine.

[43] F. P. de Ceglia, *Vampyr,* cit., p. 106. «È in effetti opportuno ricordare quanto «innaturale» e in linea di massima circoscritta ai secoli di antico regime sia l'idea di una monolitica coscienza individuale: un centro di gravità narrativo».

The modern subject is an intellectual construct that conveys, in a certain prescriptive description of the human, a very specific vision of the world, society, and power relations. It is a «perspective [...] counterintuitive. And far from being widely shared outside the homilies of priests or the treatises of certain philosophers»[44]. The belief in the plausibility of vampirism was nurtured by widespread conceptions about the nature of the self that are almost the same as those emerging from its informational consideration, such as the fragmented, non-unique nature of the Self, which instead reveals itself as a MAS. «The belief that some living vampire-like being possessed a double soul – a sort of double personality, to modernize, or a dual way of relating to the world – was not so far-fetched»[45]. Moreover, this belief was not only widespread among the superstitious populace but also among «men of culture, even in the 'enlightened' Western Europe, who, following the Platonic example, spoke of the tripartition of souls»[46]. The same is true for those who, advocating the most "orthodox" version of this belief in the multiple nature of the Self, had spoke of «functional articulations of the same physiological-behavioural spiritual principle, in the manner of Aristotle»[47]. Beliefs in the plurality of souls are based, in addition to a «resemanticization of Christianity»[48] on the intuitive realization that the self is never always the same. «I want to do one thing, but I do another; sometimes I am fully lucid, other times not; I act one way now, another way later; I ignore how my body functions, yet every organ knows what to do as if there were a little 'instructor' inside me, etc. All this could indeed give me the impression of hosting multiple spirits»[49].

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[44] «Una prospettiva [...] poco intuitiva. E tantomeno condivisa al di fuori delle omelie dei sacerdoti o dei trattati di certi filosofi» (Ibidem).

[45] «La convinzione che qualche vampiroide vivo custodisse una doppia anima – una sorta di doppia personalità, per voler attualizzare, o un duplice modo di rapportarsi al mondo – non era quindi così balzana» (Ivi, p. 107).

[46] «Uomini di cultura, anche nella "illuminata" Europa occidentale, seguendo l'esempio platonico, parlavano di tripartizione delle anime» (Ibidem).

[47] «Articolazioni funzionali di un medesimo principio spiritual fisiologico-comportamentale, alla maniera di Aristotele» (Ibidem).

[48] «Risemantizzazione del cristianesimo» (Ibidem).

[49] Ibidem. «Io voglio fare una cosa, ma ne faccio un'altra; a volte sono pienamente lucido, altre no; agisco ora in un modo, ora in uno diverso; ignoro il funzionamento del mio corpo, eppure ogni organo sa quel che deve fare come se dentro di me ci

The Self is configured, not so much differently from what Sigmund Freud, the champion of the *Third Revolution*, would have argued, as an «ecosystem of forces»[50]. This idea also has a basis in the "scientific" culture of the time. It «was especially not very far from what even certain modern Western medico-philosophical culture, with different words, would have been willing to admit»[51]. What has just been said about vampires aligns with the analysis of the phenomenon, which articulates the ethnographic-anthropological reflection within the historical-philosophical prospective, of possession.

Without delving into the specifics of the possessive phenomenon, we can also notice here the illusory nature of the claim that the subject is «an inviolable entity created by God, an immortal soul, the thinking subject who judges what is real and valid»[52]. Consider our knowledge of our own Self. It is neither the first nor the most evident: «Self-knowledge is not immediate and intuitive. Who indeed am I?» [53]. The concept of Self resulting from the anthropological analysis, similarly to the one of the analytic philosophy[54], is «the subject of predicates. Only in the course of experience are these predicates gathered, and then one attempts to determine who or what I am individually, my identity»[55].

At any given moment, like any discrete state system, *prima facie* there is only the body, and just in relation with the body we can, have instances such as a self, a consciousness that has sensations, knowl-

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fosse un piccolo «istruttore» ecc. Tutto ciò potrebbe insomma darmi l'impressione di ospitare più spiriti».

[50] «Ecosistema di forze» (Ibidem).

[51] «Soprattutto non era molto lontana da ciò che anche certa cultura medico-filosofica occidentale di età moderna, con parole differenti, sarebbe stata ben disposta ad ammettere» (Ibidem).

[52] «Un'entità inviolabile creata da Dio, un'anima immortale, il soggetto pensante che giudica ciò che è reale e valido» (P. Pecere, *Il dio che danza*, cit., p. 73).

[53] «La conoscenza di noi stessi non è immediata e intuitiva. Chi sono infatti io?» (P. Pecere, *Il dio che danza*, cit., p. 208).

[54] Cfr. M. Di Francesco, *Introduzione a Russell*, Laterza, Bari 1990, p. 98.

[55] «Io è un pronome che designa "una cosa dal significato indeterminato", cioè il soggetto dei predicati. Solo nel corso dell'esperienza si raccolgono questi predicati e si tenta quindi di determinare chi o cosa sia io individualmente, la mia identità» (P. Pecere, *Il dio che danza*, cit., p. 208).

edge, memories. But all the predicates and entities constituting identity never have a fixed and established character forever. The Self tries to build a narrative description «of its own person using its body and language to connect the elements of lived experience into a story, but the body changes, and so do the content and meaning of the story narrated by the self»[56].

This prospective cannot be be any closer to the poietic-narrative concept resulting from the informational analysises of the Self[57]. Thus,

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[56] «Il sé cerca di costruire una descrizione della propria persona usando il proprio corpo e il linguaggio per collegare gli elementi del vissuto in una storia, ma il corpo cambia, e pure il contenuto e il senso della storia narrata dal sé mutano continuamente, per gradi o per svolte radicali» (Ibidem).

[57] Cfr. *supra* respect the constitution of the Self by Information philosophy: «In order to emerge and flourish, the mind needs to make sense of its environment by continuously investing [...] with meaning. Mental life is thus the result of a successful reaction to a primary *horror vacui semantici*: meaningless (in the non-existentialist sense of 'not-yet-meaningful') chaos threatens to tear the Self asunder, to drown it in an alienating otherness perceived by the Self as nothingness, and this primordial dread of annihilation urges the Self to go on filling any semantically empty space with whatever meaning the Self can muster, as successfully as the cluster of contextual constraints, affordances, and the development of culture permit. This giving meaning to, and making sense of reality (semanticization of Being), or reaction of the Self to the non-Self (to phrase it in Fichtean terms), consists in the inheritance and further elaboration, maintenance, and refinement of factual narratives: personal identity, ordinary experience, communityethos, family values, scientific theories, common-sense-constituting beliefs, and so forth». L. Floridi,*The Philosophy of Information*, cit. ,p. 7. Informationally, the Self, personal identity, can be considered akin to Proust's narrative artifacts: «Then there is a second approach, more recent, known as the Narrative theory of the self. According to it, your identity is a 'story', understood as a socio- and/or auto-biographical artefact. Recall what Proust said about the social self. We 'identify' (provide identities to) each other, and this is a crucial, although not the only, variable in the complex game of the construction of personal identities, especially when the opportunities to socialize are multiplied and modified by new ICTs». L. Floridi, *The Fourth Revolution*, cit., pp. 68-69, translated to tackle the Self in this prospective, in a continuous co-constructive process (amplified by ICTs), the approriate LoA is necessary. «Identity and sameness relations are satisfied according to the LoAs adopted, and these, in turn, depend on the goals being pursued. This is not relativism: given a particular goal, one LoA is better than another, and questions will receive better or worse answers. The ship will be Theseus's, no matter how many bits one replaces, if the question is about legal ownership (try a Theseus trick with the taxman); it is already a different ship, for which the

it becomes evidemt how the subject is not a substantial, naturalised, or timeless entity, but a historical product, the result of a particular culture, influenced, in turn, by other worldviews.

> The psyche was initially a vital 'breath', the one that is extinguished with the last breath (an etymology similar to the one some scholars find in the link between the Sanskrit ātman and the German atmen, 'to breathe'); later, philosophy would distinguish the parts of the soul corresponding to various vital, emotional, and cognitive functions[58].

The consequences also involve another prerogative traditionally attribuited to the Subject by the philosophical modernity: Responsibility. Even within the Western tradition, this claim is unfounded: «The Homeric heroes often said they acted under the influence of a god or a demon, and only gradually did a sense of full individual responsibility develop»[59]. In conclusion, applying anthropological analysis to the Self, if «we consider globally the different perspectives of human civilisations, we realise that the person understood as a «bounded, unique, more or less integrated universe of motivation and cognition' is an exception»[60].

7. Moral Agency in a Democracy of Things

We can briefly draw the ethical consequences affecting the definition of political society. The modern subject has long been considered the only intelligent agent and, because of his monopoly of intelligence

collector will not pay the same price, if all one cares about are the original planks». L Floridi, *The Informational Nature of Personal Identity*, cit.

[58] «La *psyché* era inizialmente un "soffio" vitale, quello che si estingue con l'ultimo respiro (un'etimologia somigliante a quella che alcuni studiosi ritrovano nel nesso tra il sanscrito *ātman* e il tedesco *atmen*, "respirare"); in seguito la filosofia avrebbe distinto le parti dell'anima corrispondenti ad altrettante funzioni vitali, emotive e cognitive» (P. Pecere, *Il dio che danza*, cit., p. 73).

[59] «Gli eroi omerici dicono spesso di aver agito per l'intervento di un dio o di un demone, e solo gradualmente si sviluppa un senso di piena responsabilità individuale» (Ibidem).

[60] «Consideriamo globalmente le diverse prospettive delle civiltà umane ci accorgiamo che la persona intesa come "universo di motivazione e cognitivo delimitato, unico, più o meno integrato" è un'eccezione» (Ivi, p. 74).

and rationality, the only qualified moral agent. Only to him pertains to have agency, accountability, responsibility, and, Kantianly, freedom as a necessary condition of possibility for these categories of moral action. However, because the effect of the re-ontologizing and re-epistemologizing impact of ICT on the world and man, now the machines, at an appropriate Level of Abstraction (LoA) – constituted by *interactivity*, *adaptability*, and *autonomy*[61] – must also be considered moral agents producing ethically relevant consequences. Machines must be regarded as qualified agents, capable to participate to the "moral game"[62] in the world of the Fourth Revolution. The modern subject and its traditional concept of attibution of the moral agency – reducing morality to individual responsibility, attributing this only to the mental sphere, and making this sphere an exclusive human prerogative – have been an obstacle to the development of an informational ethical theory capable of overcoming the narrow confines of a "mi-

[61] The three characteristics represent the minimal Level of Abstraction (LoA) required to consider artificial agents as moral agents. An LoA refers to a set of relevant properties (observable, i.e., typified and interpreted variants) of a system that are selected to describe, analyze, and understand that system in a given context. Cfr. L. Floridi, *Logic of Infomation*, Oxford University Press, Oxford 2019, pp. 41-47. In general, on the concept of the Level of Abstraction, see L. Floridi, *The Method of Levels of Abstraction*, in «Minds and Machines», 18, 3, 2008, pp. 303-329. Specifically, the three characteristics of: Interactivity (1), Autonomy (2), Adaptability (3) mean: (1) that the agent and its environment can act upon each other. Typical examples include the input or output of a value or the simultaneous execution of an action by the agent and the patient, such as gravitational force between bodies; (2) that the agent is able to change its state without directly responding to the interaction. Direct response to the interaction: it can execute internal transitions to change its state. Thus, an agent must have at least two states. This property grants the agent a certain degree of complexity and independence from the environment; (3) that the agent's interactions can modify the transition rules by which it changes state. This property ensures that an agent can be seen, at a given LoA, as an agent that learns to operate in a way that critically depends on its experience. It should be noted that if the transition rules of an agent are stored as part of its internal state, discernible at this LoA, adaptability results from the other two conditions. See L. Floridi, J. Sanders, *On the Morality of Artificial Agents*, in «Minds and Machines», 14, 2004, pp. 349-379.

[62] Ivi., Allen et al. have proposed and analyzed the possibility of a *Moral Turing Test*. Allen, C. et. al., *Prolegomena to any future artificial moral agent*, «Journal of Experimental & Theoretical Artificial Intelligence», July 2000.

croethics of computers" or a simple deontology the user/programmer. An ethical theory that has profited from the combined anthropological and informational critique of the subject must be able to configure itself as patient-oriented, capable of surpassing in inclusivity – finding in information the minimal ontic and ontological level for moral consideration[63] – *non-standard* ethics (animal ethics, environmental ethics, etc.), overcoming the anthropocentric bias of classical macro-ethical theories, making the discussion of distributed morality around the actions of human, non-human, and "hybrid" agents in the world, online space, and infosphere more accessible. *Artificial Agents* (AAs), although obviously lacking *mens rea*, are capable of committing an *actus reus*[64] as, at the aforementioned LoA, they are capable of morally qualifiable actions. Producing actions that cause moral good or evil, thus moral actions[65]. If one asks, like in the essay by Daniel Dennett, who

[63] Information Ethics raises information, as a common abstraction level for the consideration of every entity (which is at a minimal ontological level, non-contradictory and denotable), to a true patient subject of ethics. This allows overcoming the biases and anthropocentric impasses of standard ethics (think, for example, of the difficulties in universalizing Kantian imperatives) and the biocentric limit of non-standard ethics such as environmental ethics. Cfr. L. Floridi, *L'etica dell'informazione. Il fondamento filosofico dell'etica informatica*, in *Infosfera. Etica e filosofia nell'età dell'informazione*, Giappichelli, Torino 2009, Ch. I, pp. 25-57. Information Ethics configured in this way is based on four fundamental rules/principles: «(1) Entropy ought not to be caused in the infosphere (null law); (2) Entropy ought to be prevented in the infosphere; (3) Entropy ought to be removed from the infosphere; (4) The flourishing of informational entities as well as of the whole infosphere ought to be promoted by preserving, cultivating, and enriching their properties» . L Floridi, *Foundations of Information Ethics*, in ed. K.E Himma, H.T. Tavani, *The Handbook Of Information And Computer Ethics*, John Wiley & Sons, Inc., Hoboken, New Jersey 2009, Chapter I. pp. 3-20. This approach allows us to escape both the narrow confines of a "conservative" interpretation where the problems posed by the digital can be solved using traditional ethical tools, and those of isolation from the discussion and mainstream ethical methods due to a radical approach to information ethics as a completely new branch, bringing radically different problems from the past and necessitating completely ad hoc solutions. Cfr. L. Floridi, *Il male artificiale nella fondazione dell'etica informatica*, cit., pp. 73-76.

[64] Cfr. L. Floridi, *The Ethics of Artificial Intelligence*, cit., p. 185.

[65] Cfr. L. Floridi, J. Sanders, *On the Morality of Artificial Agents*, cit.

is to blame if the iconic evil AI of the Stanley Kubrick's movie *2001: A Space Odissey* HAL 9000 kills someone[66].

«When HAL kills, who is guilty?», Floridi and Sanders state that «our approach allows us to say that HAL is accountable – although not responsible – if it meets the conditions defining action»[67]. Imagine a patient asking for medical advice online and the response received saves their life. Does it matter if they received the decisive feedback for their health from a real doctor or an open-source chatbot? This extension of moral categories allows for renewing the definition of sociality, and thus politics, inherited and hypostatised from tradition. Wiener, the father of cybernetics, dealing with the moral consequences of the development of autonomous machines, stated that:

> Society can only be understood through the study of messages and the communication media related to them; and that in the future development of these messages and communication media, messages between man and machines, between machines and man, and between machines and machines are destined to play an increasingly important part[68].

The key to understanding society is communication, which does not involve a monopoly of *Homo Sapiens*. The digital restructures ontologically and epistemologically the contemporary society. Now is necessary for non-human, artificial, and hybrid agents to be included and represented in their various capacities. As Wiener had foreseen, machines have joined with humans as active participants in society[69].

Thus, arises the urgency to rethink the very notion of political association, and here anthropological analysis can comes in our help, because the age of the Fourth Revolution is the age in which we must

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[66] D. C. Dennett, *When HAL Kills, Who's to Blame? Computer Ethics,* in *In Hal's Legacy: 2001's Computer as Dream and Reality*, edited by D. Stork, MIT Press, Cambridge MA 1997. pp. 351-365.

[67] «Quando HAL uccide, chi è colpevole? In realtà il nostro approccio ci permette di dire che HAL è imputabile – sebbene non responsabile – se soddisfano le condizioni che definiscono l'agire» (L. Floridi, *La moralità degli agent artificiali*, cit., p. 130).

[68] N. Wiener, *The human use of human beings, Boston,* Houghton Mifflin, p. 9.

[69] Cfr. T.W. Bynum, *Filosofia e Rivoluzione dell'Informazione.* In L. Floridi, *Infosfera. Etica e filosofia nell'età dell'informazione*, cit., p. 11.

abandon the Constitution of the Moderns and its Parliament full of Modern Subjects. It's time to extend our democracies, and the public control that comes along with a political representation thinked anew, to everything, machines, non-humans, hybrids, that has the features necessary to be a moral, social and political agent. «It is time, perhaps, to speak of democracy again, but of a democracy extended to things themselves»[70].

[70] B. Latour, *We have never been modern*, cit., p. 143.

AI and Human Leadership. Brief notes toward a new challenge for Business

Paola Manes

1.

The technological progress that has characterized recent years has led to the development of increasingly sophisticated systems, so much so that they are considered true protagonists of action, capable of developing self-learning mechanisms and making autonomous decisions, thus earning the attribute of "intelligent"[1].

In particular, these advanced technologies are increasingly used by a variety of subjects and across multiple sectors, and more and more often one hears about "data governance", a term that refers to initiatives aimed at ensuring that data are secure and well managed; hence the pressing need for extra-European, European, and national legisla-

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[1] Part of the doctrine doubts the correctness of the attribute "intelligent" referring to a machine, pointing out its inconsistency, since it is proper endowment of a human being as such. In this sense see G. Finocchiaro, *Intelligenza artificiale e responsabilità*, in «Contratto e impresa», 2, 2020, pp. 713 ss. (in particular p. 724). The author notes that «already using this term induces the development of the narrative in anthropomorphic terms». It has to be considered on the point – and to the contrary – Turing's thinking, which seems to glimpse some sort of possible correspondence between human and machine thinking. The well-known inventor assumed that a machine could be considered intelligent in case it was capable of reproducing the logic of human reasoning. This elevated the machine to a thinking object with the same human capabilities, but it certainly did not disallow that human intelligence was behind the machine. See A.M. Turing, *Computing machinery and intelligence*, in «Mind», 49, 1950, pp. 433-460. See also – particularly on the peculiarities characterizing the European approach with respect to artificial intelligence – G. Finocchiaro, *La proposta di regolamento sull'intelligenza artificiale: il modello europeo basato sulla gestione del rischio*, in «Diritto dell'informazione e dell'informatica», 2, 2022, pp. 303 ss.

tors to develop specific rules dedicated to the field of artificial intelligence[2], which are not always easy to identify[3].

As highlighted by UNESCO, digital governance can be considered a "multistakeholder" process characterized by its inclusive nature and, therefore, by the connected activities among different subjects: governments, businesses, non-governmental organizations, civil society, citizens, and other stakeholders (included in the category "various" as defined by UNESCO)[4]. The peculiarity of the multistakeholder process is that digital policies are managed collectively by the involved actors, evolving based on the guidelines established by them.

This paper describes the role of businesses in the digital transformation caused by the adoption of artificial intelligence and machine learning systems. These innovations can support business processes with the aim of enhancing the contribution that business can provide to the definition of good practices, that always see human governance in the implementation of autonomous decision-making systems with societal implications. Supercomputing systems allow, on one hand, to envision the work of algorithms on magnitudes of data previously unknown, i.e., big data, and on the other hand, they require risk management, governance, and compliance mechanisms within businesses aimed at always ensuring an ethical use of artificial intelligence that safeguards against the risks of violating fundamental rights of the individual and constitutionally protected freedoms.

Europe plays a leading role in the formulation of such rules also because it has a distinctive constitutional guarantee mark and is a large

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[2] Last March 13, the European Parliament approved – with a large majority – the Artificial Intelligence Regulation, which will now only have to await publication in the Official Journal to come fully into force.

[3] On the identification of rules applicable to artificial intelligence and for an in-depth analysis on the issues related to this topic see the recent work by G. Finocchiaro, *Intelligenza artificiale. Quali regole?*, il Mulino, Bologna 2024.

[4] The reference is to UNESCO's guidelines for the use of digital platforms, available online at the following link: https://unesdoc.unesco.org/ark:/48223/pf0000387339. It has been years since UNESCO has been playing a key role in the global debate on the use of artificial intelligence, trying to promote a comprehensive approach to understanding and addressing the issues, ranging from stakeholder empowerment, education, science dissemination, as well as ethics.

market for data; therefore, businesses can point out to policy makers the fundamental matrices with which to accompany without hindering, govern and preside over the revolution taking place. In the impact assessment, in the classification of risk-oriented AI systems, and in the use of algorithms for the common good, great value is placed on the indications from businesses as expressed in codes of conduct when these are the result of robust discussion and reasonable weighing of the interests at stake of all stakeholders.

2.

In this context, businesses certainly play a particularly significant role as they concretely and daily manage and regulate digital transformation: whether it involves large businesses that already have the computing power internally to train machine learning systems, or small and medium-sized enterprises which clearly must rely on technological infrastructure to benefit from artificial intelligence, big data, and supercomputing mechanisms.

The industry plays a central role in the market economy and must therefore remain at the heart of this further digital transformation. Indeed, companies not only perform the fundamental function of signaling the needs that the business feels and that will be satisfied through the solutions identified by digital technology, but within the same, processes are managed according to risk governance, compliance, and assessment models, which are necessary tools to support data architecture and the governance of digitalization.

It should be noted incidentally that the model adopted for the AI Act is based on a risk management approach[5], which starts from the classification of four risk categories and identifies – based on these – the methods to contain the various risks associated with them. De-

[5] The risk base approach – as is well known – is used by the Data Protection Regulation (EU Reg. 679/2016, also known as GDPR), from which the legislature certainly took its cue for the risk management structure as envisaged in the AI Act. On these profiles see G. Finocchiaro, *La regolazione dell'intelligenza artificiale*, in «Rivista Trimestrale di Diritto Pubblico», 4, 2022, (in particular see pp. 1095 ss.).

pending on the cases, certain systems are indeed prohibited, for others simple transparency obligations are foreseen, and for yet others complex and articulated procedures for the management and continuous monitoring of risks are planned.

3.

Businesses can certainly be considered formidable points of observation and development of good practices, technical standards, and self-regulation that, together with the legislator, allow for the resilient management of the digital transition on a voluntary basis. The codes of conduct and technical rules adopted by businesses are much more than a soft law and sometimes are capable of anticipating the choices of policymakers, pointing the way for regulators. The technological transformation adopted in business models provides solutions adopted by the business community, attempts to regulate the market uniformly from the bottom up through the tools offered by digital innovation, and plays a key role in co-regulation in a polycentric, multilevel, and fluid system of sources[6] and, particularly, of the legal rules specific to advanced technologies.

Therefore, the governance of digital needs the significant contribution of businesses that adopt a responsible position and approach towards digital governance. The governance models, risk oversight, compliance based on use cases directly emerging from business life allow, in the case of algorithms, the in vivo adoption of systems for training, risk mitigation, monitoring the lifecycle of systems equipped with artificial intelligence, and tracking of all phases of the process from data creation to the final product being placed on the market in line with what is stipulated by European legislation.

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[6] On this point see the recent contribution by C. Del Federico, *Intelligenza artificiale e responsabilità civile*, in «Jus Civile», 5, 2023; in particular see par. 2 in which the author addresses the problem of sources.

Conclusions

Making businesses protagonists in the governance of digital, alongside the regulator and the institutions, makes it possible to select those actors willing to embrace the ethical challenge of digital transformation, the human-led governance of blue transformation[7]: the reputation of businesses that commit to strict and stringent standards on governance depends on the effectiveness of the systems they implement, and this guarantees them – without a doubt – a competitive advantage, since it allows them to assure all stakeholders of the long-lasting benefits produced by digital and the benefit for the community. Obviously, the processes of digitization of enterprises conceal – as is well known – multiple risks[8], which must undoubtedly be monitored – and indeed prevented – through well-defined strategies, aimed in particular at cyber security[9].

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[7] See among all, L. Floridi, *Etica dell'intelligenza artificiale*, Raffaello Cortina Editore, Milano, 2022; by the same author see *Il verde e il blu*, Raffaello Cortina Editore, Milano 2020. On ethical profiles see also L. Floridi, F. Casolari, C. Buttaboni, *The EU Data Act in Context: A legal assessment*, in «International Journal of Law and information Tecnhnology», 31 (4), 202, pp. 399-412. See also the document entitled Rome call for AI ethics, signed on February 28, 2020 in Rome at the Conciliation Auditorium at the Vatican as part of the meeting entitled *The good algorithm? Intelligence: ethics, law and health*, sponsored by the Pontifical Academy of Life headed by Mons. Vincenzo Paglia; as well as *Harnessing Innovation: Israeli Perspectives on AI Ethics and Governance*, Report for Cahai, October 2020.

[8] On the possible risks associated with the use of artificial intelligence and their management see the paper entitled *Artificial Intelligence Risk Manegement Framework*, drawn up by the National Institute of Standards and Technology U.S Department of Commerce, January 2023, in https://doi.org/10.6028/NIST.AI.100-1.

[9] For the right and informed use of systems with artificial intelligence see the paper prepared by the University of Bologna and Oxford University to help companies and organizations follow future European regulations on artificial intelligence systems: capAI, *A procedure for conducting conformity assessment of AI systems in line with the EU Artificial Intelligence Act*, in https://ssrn.com/abstract=4064091; see most recently the contribution of C. Novelli, F. Casolari, A. Rotolo, M. Taddeo, L. Floridi, *AI Risk Assessment: A Scenario-Based Proportional Methodology for the AI Act*, in «Digital Society», 3, 2024, pp. 1-29.

Verso un'intelligenza democratica o una democrazia artificiale? Ambiente e profitti: spunti per una riflessione complessiva[1]

Leonardo Masone, Eléna Grobler

Introduzione

Sebbene il tema dell'Intelligenza Artificiale (AI) sia ormai dibattuto in maniera interdisciplinare, la letteratura non è ancora pervenuta a una definizione che trovi tutti gli studiosi completamente d'accordo. Per lo scopo del presente articolo, però, ci basta isolare due aspetti del fenomeno: la dimensione della tecnologia linguistica e comunicativa e la potenza economica che la produce. I grandi cambiamenti della storia dell'uomo, in qualsiasi modo la genericità di questi termini può essere interpretata, hanno sempre fatto i conti con la questione del linguaggio e i temi sociali ed economici. È quasi scontato affermare quanto la scrittura abbia rappresentato una svolta decisiva dell'umanità: le parole, i discorsi, le riflessioni una volta affidati alla scrittura diventano patrimonio culturale di una comunità. Secondo il biologo e antropologo americano Jared Diamond, per esempio, oltre alla superiorità in ambito bellico e alla resistenza immunologica rispetto a certe malattie di natura microbica conquistata nel tempo, la scrittura e l'esistenza di un alfabeto semplificato e comprensibile non solo agli strati sociali politicamente dominanti hanno determinato una maggiore capacità di invenzione e diffusione tecnologica e con essa una più complessa organizzazione amministrativa e sociale in diverse aree del continente europeo, almeno in età moderna, che ha poi prodotto il dominio storico sui "nuovi mondi"[2]. Solo per prendere in considerazione un perio-

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[1] Nel presente saggio, Leonardo Masone è autore dell'introduzione, del paragrafo 1 e delle riflessioni conclusive, mentre Eléna Grobler è autrice del paragrafo 2.

[2] J.M. Diamond, *Guns, Germs and Steel. The Fates of Human Societies*, W.W. Norton & Company, New York-London 1997.

do relativamente recente, si pensi a quanto la diffusione di nuovi testi avvenuta grazie alla stampa, per esempio, abbia rappresentato un ampliamento del sapere anche al di fuori della cerchia esclusiva delle *élite* dominanti. In egual maniera le rivoluzioni socio-economiche, su tutte la rivoluzione industriale, hanno determinato quasi sempre radicali cambiamenti rispetto ai costumi, alle visioni del mondo e più in generale alle forme culturali, modificando quasi sempre il tenore di vita complessivo delle persone di un determinato tempo.

I cambiamenti della dimensione linguistica, dunque, in quanto strumento fondamentale dell'esistenza relazionale umana, sono capaci di modificare i paradigmi mentali dell'uomo e della donna di una determinata epoca e conducono anche al rinnovamento delle conoscenze e alla loro trasmissione e organizzazione sociale. Le rivoluzioni economiche hanno portato con sé anche imponenti trasformazioni delle dinamiche del lavoro, della loro velocità e intensità quotidiane, e dunque delle relazioni sociali. L'irreversibile metamorfosi della comunicazione alla quale si assiste oggi, imposta sovente dalle grandi concentrazioni di potere economico, sta modificando profondamente i saperi codificati e con essi la vita materiale e simbolica delle persone. E anche questo è un tema dirimente per la vita democratica di ogni paese. Oltre agli indubitabili benefici, infatti, sul tema dell'Intelligenza Artificiale, lo scenario complessivo non è esente da preoccupanti punti critici. Soprattutto per quanto riguarda la *governance*, l'accesso ai saperi, la trasparenza delle fonti, la tenuta del dibattito pubblico. In una parola, la salute della democrazia, o cosa di essa sta rimanendo. Gli sforzi normativi sono indispensabili per un riequilibrio dei rapporti tra le imprese dell'AI e pubblico, ma la difficoltà di assistere a un'autentica svolta positiva è legata alla mancata comprensione che il cambiamento sia linguistico-comunicativo, sia socio-economico sono i veri fattori determinanti per la tenuta dei rapporti democratici. Ma c'è un ulteriore tema che incide in questo tipo di discorso, ed è quello che riguarda la gestione pubblica (o privata) dei dati e dei metadati su cui bisogna fare particolare attenzione. Si analizza, infatti, in questa sede il tema del diritto ambientale e della questione agricola, con particolare riferimento alla ricezione da parte dell'Ue e dei suoi Stati membri, anche in relazione all'attività delle multinazionali del settore.

Per una brevissima disamina dell'attuale contesto normativo

Traduzione di testi, riconoscimento facciale, identificazione di brani musicali, sono solo alcune delle funzioni che i sistemi di intelligenza artificiale sono in grado di svolgere: l'obiettivo del *machine learning*[3], infatti, è quello di attribuire alla 'macchina' una capacità di apprendimento autonoma, estraendo nuove conoscenze dalla costante esperienza[4]. Questi sistemi consentono di costruire modelli a partire da esempi, purché si abbiano a disposizione potenti infrastrutture di calcolo e enormi quantità di dati, e, come è noto, grazie a tali servizi, già all'inizio del secondo decennio del XXI secolo, molte aziende tecnologiche detenevano l'accesso al mercato necessario per l'intercettazione, la raccolta e l'elaborazione di notevoli flussi di dati e metadati individuali[5]. Il trattamento delle informazioni è un processo strategico fondamentale, il cui impatto spazia dai modelli di business delle imprese agli equilibri geopolitici tra i diversi Stati. La definizione di un quadro normativo capace sia di tutelare i cittadini, purtroppo considerati troppo spesso solo come consumatori, sia di valorizzare le pratiche di condivisione dei dati, è una questione complessa, ma allo stesso tempo dirimente[6]. Prima dell'approvazione da parte del Parlamento europeo della prima specifica regolamentazione sull'intelligenza artificiale nel marzo del 2024, l'indirizzo normativo dell'Unione Europea era iniziato 'dal basso' con la pubblicazione della Direttiva sulla *Privacy*

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[3] D. Tafani, *Sistemi fuori controllo o prodotti fuorilegge? La cosiddetta «intelligenza artificiale» e il risveglio del diritto*, «Bollettino telematico di filosofia politica», 2023, p. 1.

[4] A partire dalle ricerche di Warren McCulloch e Walter Pitts, e poi riprese nel 1958 da Frank Rosenblatt che realizzò un neurone artificiale denominato *perceptron* (cfr. T. Casadei, S. Pietropaoli, *Intelligenza artificiale: l'ultima sfida per il diritto?*, in T. Casadei, S. Pietropaoli (a cura di), *Diritto e Tecnologie informatiche. Questioni di informatica giuridica*, Wolters Kluwer Italia, Milano 2024, p. 263).

[5] J. Sadowski, T. Phan, *Open Secrets': An Interview with Meredith Whittaker*, in T. Phan, J. Goldenfein, D. Kuch, M. Mann (a cura di), *Economies of Virtue: The Circulation of 'Ethics' in AI*, Institute of Network Cultures, Amsterdam 2022, pp. 147-159.

[6] P. Bellini, E. Campanella, A. Piccioni, *The impact of Artificial Intelligence and Data on political power and geopolitical equilibria*, «Metabasis.it. Filosofia e Comunicazione», 2/2023, pp. 6-7.

nel 2002 e *GDPR – Regolamento generale sulla protezione dei dati* nel 2016, che prevedeva due successivi provvedimenti relativi alla pubblicazione della proposta di regolamentazione dell'uso degli algoritmi di intelligenza artificiale. Il primo, noto come *AI Act* del 2021, è una sintesi di una serie di atti dell'Ue e dell'Ocse[7]; mentre la seconda è una proposta per la gestione e la condivisione dei dati chiamata *Data Governance Act* che rappresenta un'introduzione all'idea che la sovranità digitale si possa basare sulla collaborazione tra gli Stati.

Il punto è che l'AI ha ormai un impatto decisivo sul diritto, e tale tema impone un radicale ripensamento della sua pratica se non addirittura della sua stessa natura. Per un buon numero di giuristi, si pone come necessaria l'elaborazione di nuove metodologie per l'applicazione delle regole e la formulazione di nuovi concetti giuridici finalizzati a un diritto oggettivo, imparziale e impermeabile alle passioni e alle emozioni umane[8]. Ma quanto incide questo approccio sul tessuto democratico degli Stati e dei suoi cittadini?

Sulle direttive ambientali

In questa direzione, si potrebbero prendere ad esempio diversi ambiti disciplinari. In questa sede, ci occuperemo brevemente della questione inerente al rapporto tra il diritto europeo e l'ambiente, con particolare riferimento ai reati. In base alla recentissima Direttiva Ue 2024/1203 del Parlamento europeo e del Consiglio, dell'11 aprile 2024, sulla tutela penale dell'ambiente in sostituzione le direttive 2008/99/CE e 2009/123/CE, in GU L, 2024/1203, 30.4.2024, il numero di condotte illecite passano da nove a venti. Essa contiene 30 articoli che costituiscono norme minime per la definizione dei reati e delle sanzioni al fine di tutelare più efficacemente l'ambiente, nonché misure finalizzate alla prevenzione e al contrasto della criminalità ambientale e all'applicazione efficace del diritto ambientale dell'Unione. Fra gli articoli

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[7] K. Yeung, *Recommendation of the council on artificial intelligence (OECD)*, «International Legal Materials», 1/2020, pp. 27-34.

[8] Cfr. V. Giordano, *Intelligenza artificiale e pratica dei diritti*, in T. Casadei, S. Pietropaoli (a cura di), *Diritto e Tecnologie informatiche*, cit., pp. 275-284.

rilevanti, la direttiva 2024/1203 richiede agli Stati membri di elaborare una strategia nazionale di materia di lotta contro i reati ambientali entro il 21 maggio 2027. Inoltre, gli Stati dovranno predisporre un sistema di registrazione, produzione e fornitura di dati statistici in forma anonima sulle fasi di comunicazione, di indagine e di azione giudiziaria per quanto riguarda i reati di cui agli artt. 3 e 4, per monitorare l'efficacia delle loro misure di lotta contro i reati ambientali. Si applica solo ai reati commessi all'interno dell'UE, ma gli Stati membri possono decidere di estendere la loro giurisdizione a reati commessi al di fuori del proprio territorio.

Inoltre, la nuova direttiva introduce una clausola relativa ai 'reati qualificati' che si applica quando un reato di cui alla direttiva è commesso intenzionalmente e provoca la distruzione dell'ambiente o un danno irreversibile o duraturo allo stesso: tra essi, il commercio illegale di legname; l'esaurimento delle risorse idriche; le gravi violazioni in materia di sostanze chimiche; l'inquinamento provocato dalle navi. Dunque, in estrema sintesi, per 'reati qualificati' si intendono quei gravi illeciti che portano alla distruzione di un ecosistema e sono, quindi, paragonabili all'ecocidio. La disciplina precedente sulla criminalità ambientale risale al 2008 (direttiva 2008/99/CE), che tuttavia si limitava a stabilire uno standard minimo di protezione dell'ambiente attraverso il diritto penale degli Stati membri che comunque avevano autonomia nell'introduzione di misure di protezione più o meno rigorose, ma nella maggior parte dei casi tali libertà di azione si è tradotta solo in buoni propositi[9]. Attualmente, le sanzioni previste agli artt. 5 e 7 prevedono la reclusione dai 5 ai 10 anni. Oltre alla possibilità da parte degli Stati membri di perseguire i reati commessi anche al di fuori del proprio territorio, è prevista l'assistenza nel contesto dei

[9] L'ordinamento italiano, per esempio, aveva recepito la Direttiva 2008/99/CE (insieme alla direttiva 2009/123/CE che modifica la direttiva 2005/35/CE relativa all'inquinamento provocato dalle navi) attraverso il DL n. 121 del 7 luglio 2011, con cui si introducevano nuove fattispecie di reati ambientali nel Codice Penale: per esempio l'art. 727-bis che puniva l'«Uccisione, distruzione, cattura, prelievo, detenzione di esemplari di specie animali o vegetali selvatiche protette»; oppure l'art. 733-bis – Distruzione o deterioramento di habitat all'interno di un sito protetto. La legge n. 68, 22 maggio 2015, inoltre ha introdotto nell'ordinamento nazionale anche un nuovo titolo VI-bis (Dei delitti contro l'ambiente), composto da 12 articoli (dal 452-bis al 452-ter).

procedimenti penali per coloro che denunciano reati ambientali (art. 14). Ma al fine di rendere le procedure più efficaci, in che modo i governi possono agire nel contrasto dei reati ambientali qualificati usufruendo dei dati in possesso di operatori privati? In quest'ottica, al di là della questione strettamente repressiva, la questione della condivisione dei dati per l'ampliamento pubblico dei saperi si allarga anche alla dimensione agricola e all'utilizzo pratico di strumenti tecnologici.

Sul tema dell'esercizio democratico nella gestione dei dati, gli Stati vanno ancora a rilento, conservando in molte circostanze *vulnus* (*vulnera*) normativi insostenibili; numerosi, infatti, sono i casi di imprese medie o multinazionali che talvolta giocano partite in solitaria o comunque con una disparità di mezzi nei confronti di altri operatori del settore, e più in generale rispetto alla cittadinanza.

Un caso agricolo

Nell'ultimo decennio si è assistito a un'ondata di fusioni tra i 'giganti' dell'agricoltura. Nel 2013, per esempio, Monsanto ha acquisito per la cifra di 1 miliardo di dollari The Climate Corporation, altra multinazionale del settore, e con essa i suoi *dataset*. Questo tipo di operazioni ha dato avvio a una tendenza più ampia in materia di fusioni, o sarebbe il caso di parlare di mega-fusioni: si pensi a ChemChina con Syngenta, Dow con DuPont, e infine Bayer proprio con Monsanto. Tutto ciò ha concorso alla diminuzione del numero di *competitor* sul mercato della produzione agricola, ma anche nell'ambito più specifico dell'agricoltura digitale (DAs), dunque dell'applicazione delle tecnologie nei processi agricoli. Tuttavia, solo nel caso Bayer/Monsanto, la Commissione ha ritenuto opportuno condurre un'indagine di approfondimento, anche per l'enormità delle 'dimensioni aziendali' e l'eventuale incidenza sui processi commerciali (Regulation of European Commission n. 139/2004 Merger Procedure)[10].

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[10] Cfr. C. Atik, *Understanding the role of agricultural data on market power in the emerging Digital Agriculture sector: a critical analysis of the Bayer/Monsanto decision*, in D. Bosco, M.S. Gal (a cura di), *Challenges to assumptions in competition Law*, Edward Elgar Publishing, Cheltenham (UK) 2021, pp. 37-74.

Dalla procedura ispettiva della Commissione Europea si è evinto che l'operazione di fusione avvenuta tra le due multinazionali avrebbe creato il più grande operatore globale di sementi e prodotti fitosanitari a livello mondiale e ciò avrebbe un impatto significativo sui prezzi e sull'innovazione nei relativi mercati settoriali, oltre che nel campo dell'agricoltura digitale (DAs). Gli agricoltori e ancor meno i singoli cittadini, d'altro canto, hanno un potere decisionale molto limitato per quanto riguarda l'accesso ai *databases* già acquisiti dalle Agricultural Technology Providers (ATP) e di conseguenza relativamente alla possibilità di un loro reale libero utilizzo[11]. Ci sarebbero due ragioni principali per comprendere tale *lock-in* dei dati nelle DAs: il primo riguarda l'ambiguità legale dei diritti sui dati stessi, il secondo concerne le barriere tecniche per il loro trasferimento. Nella direzione dei servizi in seno all'agricoltura digitale, risulta di estrema rilevanza la comprensione del concetto di dati agricoli (o agronomici), e dunque del loro *status* giuridico. Essi possono essere analizzati da due diverse prospettive: le fonti di raccolta e la funzione. Esistono infatti i cosiddetti dati aziendali, ossia quelli raccolti dalle aziende agricole tramite sensori, macchine o direttamente dagli agricoltori; quelli complementari meteorologici, satellitari e altri dati ambientali; e infine quelli proprietari, concernenti maggiormente gli aspetti economici. Al fine di fornire agli agricoltori servizi di Agricoltura Digitale, potrebbero essere necessarie diverse combinazioni di questi *dataset* a seconda del tipo di servizio a cui è interessato l'imprenditore agricolo. Affinché venisse approvata la fusione tra i due grandi colossi, da tale procedura, l'Unione Europea ha imposto al nuovo operatore la cessione degli asset sia per quanto riguarda il trattamento delle sementi e dei pesticidi, sia per le attività di Agricoltura Digitale. In questo senso, sebbene la commissione Europea non abbia di fatto aperto una discussione sul tema della normativa complessiva inerente all'utilizzo dei dati, la decisione intrapresa nei confronti di Bayer/Monsanto potrebbe potenzialmente segnare un indirizzo legislativo, soprattutto in termini di dati personali o non personali.

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[11] Cfr. T. Verdonk, *Planting the Seeds of Market Power: Digital Agriculture, Farmers Autonomy, and the Role of Competition Policy*, in L. Reins (a cura di), *Regulating New Technologies in Uncertain Times*, Springer, Berlin 2019, pp. 112-115.

Così come i dati complementari e proprietari, anche i cosiddetti dati aziendali sono considerati come generati dalle macchine, quindi non come dati personali, in quanto legati all'ambiente e alle prestazioni dei fattori di produzione agricoli che potrebbero non facilmente essere associabili a una persona fisica. Infatti, il paragrafo 9 del Regolamento relativo al quadro di riferimento per la libera circolazione dei dati non personali nell'Unione europea riporta quelli agricoli come esempio di dati di questo tipo (Regulation (EU) n. 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data ('GDPR') [2016] OJ L 119/1.). Va ricordato che gli unici beneficiari delle norme sulla protezione dei dati ai sensi del GDPR sono le persone fisiche; pertanto, le aziende agricole, comprese le PMI e le Società di Capitale, non possono istituzionalmente beneficiare del suddetto quadro normativo. E purtroppo tale cavillo si estende anche agli agricoltori, creando un'evidente confusione: siccome i lavoratori agricoli, tra l'altro, non hanno un rapporto contrattuale diretto con le ATP, allo stato attuale, risulta complicato stabilire chi ha diritto a raccogliere i dati. Inoltre, il regolamento sul libero flusso dei dati non prevede alcun vincolo al loro trasferimento su *database* non personali.

Il 23 aprile 2018, diverse associazioni agroalimentari dell'UE hanno presentato a Bruxelles il Codice di Condotta Comune dell'UE sulla condivisione dei dati agricoli. Tuttavia, sebbene questo atto rappresenti uno sforzo degno di nota per mitigare le ambiguità legali nel settore, non si tratta di una normativa vincolante, ma piuttosto di linee guida che potrebbero essere seguite volontariamente dagli *stakeholder* del settore. Inoltre, la libertà contrattuale prevale nonostante le regole proposte: se non diversamente concordato nel contratto, l'agricoltore che introduce i dati nel sistema avrebbe teoricamente il diritto di trasmetterli a un altro utente, ma considerandone la debolezza della posizione al cospetto delle ATP durante la stipula dei contratti, si può affermare che il Codice di Condotta dell'UE non presenta un approccio utile al problema del *Lock-in.* In relazione a tale ambiguità giuridica, il dibattito recente si è posto la questione dell'appartenenza o meno dei dati agli agricoltori, oppure agli ATP, o ai proprietari terrieri o

addirittura ai finanziatori[12]. Questa incertezza preoccupa ancora una volta la prima di queste categorie, che potrebbe non avere discrezione sui dati raccolti; tale preoccupazione che potrebbe influire negativamente sullo sviluppo del settore è stata menzionata anche nel workshop EIP-AGRI del 2016.

Per gli obiettivi del presente studio, un solido e rilevante esempio potrebbe riguardare la piattaforma FieldView di Monsanto inglobata in Bayer, la quale opera una chiara distinzione tra dati personali e non personali. Le disposizioni relative ai dati agricoli non personali iniziano affermando che gli agricoltori e le aziende agricole sono proprietari dei dati, ma il resto del testo mostra invece che i dati possono essere condivisi solo con altri FieldView o con i partner ad essa connessa. Non c'è alcun inciso sul trasferimento di questi dati al di fuori della specifica piattaforma, perché il medesimo testo redatto dalla Monsanto afferma che sia l'hardware, sia il software sono concessi in licenza, non venduti. Come evidenziato, dal momento che non esiste una normativa specifica che regola questo preciso aspetto dell'elaborazione dei dati, è difficile capire come gli agricoltori possano trasferire i propri dati verso altre piattaforme. Ambiguità simili emergono anche per quanto riguarda le macchine agricole, perché anch'esse posseggono un'attrezzatura tecnologica atta alla raccolta dei dati (EIP-AGRI report, n. 110, p. 10). In tale contesto, le multinazionali del settore dei macchinari agricoli applicano accordi di licenza con l'utilizzatore finale (EULA): in essi, ci sono particolari disposizioni che consentono ai produttori di macchinari di bloccare le informazioni tecniche nella disponibilità degli agricoltori qualora non si attengano alle linee guida per la raccolta dati previste dalla stessa EULA. Altresì, si sostiene che gli agricoltori ottengono solo una licenza per la durata del veicolo al momento dell'acquisto, per esempio, conservandone quindi la proprietà, vincolandone quindi operazioni come l'assistenza tecnologica e la manutenzione. Se a ciò si aggiunge la dipendenza dai dati, è estremamente difficile parlare di libertà di scelta da parte degli agricolto-

[12] J.K. Archer, C.A. Delgadillo, *'Key Data Ownership, Privacy and Protection Issues and Strategies for the International Precision Agriculture Industry'*, in Proceedings of the 13th International Conference on Precision Agriculture. Saint Louis, Missuri (USA) 2016, p. 3.

ri. In conclusione, la cristallizzazione di tali pratiche potrebbe orientare la consuetudine normativa con il rischio che essa diventi regola. E anche questi passaggi assumono le forme di un restringimento democratico.

Riflessioni conclusive

Il tema del "nuovo diritto", che meriterebbe uno studio specifico a sé, è solo uno degli argomenti che si impongono al dibattito pubblico in relazione allo stato della democrazia in rapporto con l'AI. Ma certamente ineluttabile. Di sicuro, non è possibile che gli unici attori di queste trasformazioni tecnologiche epocali siano solo le grandi imprese e che le prospettive dello sviluppo restino confinate esclusivamente all'interno di un'ottica di profitto. Ma non è nemmeno possibile che gli Stati nazionali individuino come interlocutori per elaborare e implementare una strategia operativa e legislativa solo soggetti legati al mondo dell'impresa o dell'accademia, che in molte circostanze funge solo da ente di legittimazione 'freddamente scientifica' capace di effettuare pratiche decise a monte[13]. Così come non è possibile che cittadine e cittadini rappresentino per le politiche governative di regolamentazione solo ed esclusivamente dei consumatori o degli utenti di servizi vari forniti dallo Stato e non in quanto soggetti dotati di diritti civili e politici destinati anche a governare le trasformazioni tecnologiche attraverso vecchi e nuovi strumenti democratici[14].

Le politiche di organizzazioni sovranazionali come l'Ue, l'Onu, l'Unesco, l'Ocse, che puntano a irrobustire riferimenti normativi in seno all'azione legislativa dei governi nazionali, palesa una quasi totale assenza di attenzioni ai diritti democratici. Prevale in esse l'interesse privato: una lettura attenta di tali politiche svela, infatti, le dinamiche che le ispirano e i poteri socio-economici di riferimento. In questa

[13] Cfr. T. Casadei, *Istituzioni e algoritmi: tra strategie funzionali ed "effetti collaterali"*, in U. Salanitro (a cura di), *Smart. La persona e l'infosfera*, Pacini giuridica, Pisa 2022, pp. 245-265.

[14] Cfr. A. Simoncini, S. Suweis, *Il cambio di paradigma nell'intelligenza artificiale e il suo impatto sul diritto costituzionale*, «Rivista di Filosofia del diritto», 1/2019, pp. 87-106.

direzione si può intravedere già un primo approfondimento della *Risoluzione* del Parlamento Europeo del 3 maggio 2022 sull'Intelligenza artificiale nell'era digitale che prende in esame sei casi di studio: la salute, il green deal, la politica estera e la sicurezza, la competitività, il mercato del lavoro e da ultimo il futuro della democrazia.

Si mostrano con una certa urgenza come prioritarie, dunque, nuove riflessioni a proposito delle criticità in relazione alle conoscenze, alla loro verificabilità, all'accesso e alla qualità dei dati assunti dall'AI. Gli interrogativi proposti dalla *Risoluzione* non possono non riguardare il ruolo dell'UE, in particolare nel contesto della competitività globale e delle opportunità che la costruzione sia di un quadro giuridico e normativo comune, sia di un mercato unico digitale possano generare. Se è vero che il documento propone la valorizzazione dei talenti e il finanziamento della ricerca pubblica sulla stessa AI con un taglio più sociale, è altrettanto chiaro come a tale impostazione manchi una prospettiva più generale e una strategia strutturale.

Affrontare la questione dell'AI non può essere una responsabilità delle singole imprese, ma riguarda il rapporto tra conoscenza e democrazia; al momento però i soggetti deputati a governare il fenomeno, ovvero gli Stati, hanno quasi completamente abdicato alla determinazione dell'esercizio democratico. L'unica possibilità per uno sviluppo autenticamente sociale è che soggetti collettivi si assumano tale responsabilità, ossia quella di gestire l'impatto delle AI sulla società, e in particolare sul mondo del lavoro. Solo attraverso una *governance* condivisa, di concerto fra governi, organizzazioni sindacali e altri soggetti collettivi, è possibile promuovere un confronto pubblico, proponendo regolamenti e precisi standard etici che diano una direzione allo sviluppo e all'utilizzo delle AI e garantiscano che questa diventi una tecnologia a servizio della collettività.

Apprendimento automatico, salute mentale ed eugenetica

Dan Mcquillan

Introduzione

L'apprendimento automatico è destinato a essere irreversibilmente coinvolto nella diagnosi della salute mentale. Il cosiddetto fenotipo digitale è vertiginosamente ampio, tanto che i cambiamenti nell'uso degli smartphone, i dati dei fitness tracker o il tono delle parole che usiamo su Twitter diventeranno fattori di diagnosi predittiva. Ma si tratta di una collisione tra l'esattezza computazionale e le incoerenze nascoste dall'etichettatura psichiatrica. Mentre l'idea della 'psichiatria di precisione' promette di individuare l'insorgenza precoce della psicosi prima che i servizi o l'individuo stesso siano in grado di farlo, i movimenti degli utenti sostengono che molto di ciò che viene medicalizzato è l'espressione di un trauma o di un disagio. I volumi di dati necessari per l'IA richiederanno una sorveglianza pervasiva che amplificherà l'ansia già instillata da un sistema di prestazioni, con una natura diffidente e punitiva. L'IA non è un attore neutrale, ma peserà pesantemente sul lato del riduzionismo biologico, rafforzando la comprensione dei problemi di salute mentale come disturbi dei circuiti cerebrali piuttosto che come conseguenza di eventi avversi della vita. Ciò è parallelo al campo emergente della sociogenomica e all'uso di studi di associazione genomica (GWAS) per correlare lo status sociale a fattori genetici distribuiti, riaprendo narrazioni eugenetiche che erano state considerate come sepolte nella storia. Sia la psichiatria di precisione che i GWAS classificano i problemi di salute mentale come tendenze innate e agiscono come cortine fumogene per oscurare le condizioni sociali e politiche. Per superare la coscienza di spettatore dell'IA, abbiamo bisogno di pratiche tecniche critiche che possano svincolare le distanze vettoriali dalle differenze sociali. Ciò può avvenire attra-

verso un'IA femminista che attinga alla teoria degli standpoint e agli approcci femministi alla scienza, combinati con strutture collettive di ricerca che includano coloro che sono più coinvolti nel processo di indagine. Abbiamo bisogno di una psicopolitica alternativa dell'apprendimento automatico.

Fenotipo digitale

La generazione di dati da parte dei nostri numerosi dispositivi e l'analisi di tali dati da parte dell'apprendimento automatico è destinata a diventare così profondamente coinvolta nella diagnosi delle malattie, da offuscare i confini tra il digitale e il biologico e cambiare ciò che è considerato conoscibile sui nostri corpi e cervelli.

Un'idea chiave di questi sviluppi è nota come fenotipizzazione digitale[1]. Essa descrive i nostri tratti osservabili, come l'aspetto fisico, la biochimica e il comportamento. A differenza del genotipo, l'insieme dei geni che codificano le caratteristiche, il fenotipo è il prodotto dell'espressione genica e dei fattori ambientali. Sappiamo che il colore degli occhi è determinato geneticamente e che l'alimentazione infantile influisce sulla statura da adulti. Ma ora si propone che i tempi di reazione alla tastiera, l'attenzione allo schermo e le caratteristiche catturate digitalmente della nostra voce costituiscano i nostri fenotipi digitali[2]. In altre parole, si tratta di corollari sufficientemente solidi alle osservazioni tradizionali rispetto ai mutamenti delle malattie in modo da poter essere sia diagnostici sia prognostici, identificando i sintomi prima che siano altrimenti osservabili e fornendo potenziali percorsi di intervento precoce.

La portata del fenotipo digitale è vertiginosamente ampia e, in alcuni casi, piuttosto superficiale. L'attività dello smartphone durante la notte è vista come un tracker per l'insonnia[3], e i dati dei monitor

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[1] S.H. Jain, B.W. Powers, J.B. Hawkins, J.S. Brownstein, *The Digital Phenotype. Comments and Opinion*, «Nature Biotechnology», 5/2015, pp. 462-463.

[2] T.R. Insel, *The NIMH Research Domain Criteria (RDoC) Project: Precision Medicine for Psychiatry*, «American Journal of Psychiatry», 4/2014, pp. 395-397.

[3] D.J. McIver, J.B. Hawkins, R. Chunara, A.K. Chatterjee, A. Bhandari, T.P. Fitzgerald, S.H. Jain, J.S. Brownstein, *Characterizing Sleep Issues Using Twitter*, «Journal of Medical Internet Research», 6/2015, pp. 227-233.

per il fitness sono usati per caratterizzare le malattie cardiometaboliche[4]. Ma la fenotipizzazione digitale ha implicazioni più profonde sia dal punto di vista medico sia politico. Queste stanno diventando visibili nella sua proposta di applicazione alla salute mentale, dove si fornirà «una valutazione longitudinale passiva, oggettiva, continua e ubiquitaria dell'umore e della cognizione (e) firme per la previsione e la prevenzione»[5]. La fenotipizzazione digitale è proposta come modalità di accesso diretto ai sintomi della salute mentale; i comportamenti bipolari catturati dai social media, i segnali sensoriali di entropia correlati alle valutazioni dell'umore, la depressione e la psicosi individuate dall'incoerenza semantica nei campioni di parlato.

Non si tratta solo di una sostituzione con il monitoraggio digitale, ma della capacità del fenotipo digitale di rivelare nuovi segnali clinicamente rilevanti e di modificare la percezione della manifestazione di una patologia. L'idea è che il potere predittivo dei dati e l'apprendimento automatico raggiungeranno il graal della medicina preventiva, oltre a diventare un canale diretto per il cambiamento dei comportamenti, evitando la fatica della formazione alla salute pubblica. Il termine biomarcatore si riferiva ai risultati di una biopsia o di un esame del sangue, ma ora, secondo uno dei maggiori ricercatori statunitensi del settore «the biomarker is some combination of GPS and, from the watch, seeing your heart rate spike», così che un qualsiasi direttore di un Centro per la salute mentale digitale di una qualsiasi università può dire, riferendosi ai dati dei sensori degli smartphone come l'accelerometro e il microfono, «this is going to be our MRI scan in behavior»[6]. La fenotipizzazione digitale non consiste solo nel disporre di un'enorme serie di dati, ma nell'utilizzare un software per trasformarli in qualcosa di riconoscibile, il che richiederà spesso l'apprendimento automatico anche a causa della complessità dell'adattamento dei

[4] M.A. Kirk, M. Amiri, M. Pirbaglou, P. Ritvo, *Wearable Technology and Physical Activity Behavior Change in Adults With Chronic Cardiometabolic Disease: A Systematic Review and Meta-Analysis*, «American Journal of Health Promotion», 5/2019, pp. 778-791.

[5] P. Dagum, *Digital Phenotyping in Mental Health*, interview presented at the National Alliance in Mental Health Convention in December 2017.

[6] P. Biegler, *Tech Support: How Our Phones Could Save Our Lives by Detecting Mood Shifts*, «The Sydney Morning Herald», 10 novembre 2017.

modelli. Un fatto spiacevole riguardo alla diagnosi della salute mentale è l'incoerenza delle diagnosi tra i singoli psichiatri. Le ricerche rivelano che l'affidabilità delle valutazioni psichiatriche è statisticamente debole[7]; cioè, la diagnosi varia così tanto tra gli psichiatri da risultare empiricamente inaffidabile[8]. Gli studi dimostrano anche che i criteri per il disturbo depressivo sono scarsamente correlati e incoerenti tra loro, mentre altri ricercatori mettono in dubbio proprio le basi concettuali per la diagnosi di schizofrenia[9].

Le categorizzazioni apparentemente empiriche della psichiatria sono impantanate in varie controversie e sono fortemente contestate, non da ultimo da molti utenti dei servizi di salute mentale. Per capire perché l'apprendimento automatico si schiera così fortemente in questo dibattito, dobbiamo esaminare il modo in cui esso immagazzina i dati. L'apprendimento automatico impara adattando interattivamente i dati a un insieme di risultati etichettati, o target. Le operazioni matematiche ottimizzano una funzione di perdita a cui si somma il divario statistico tra le previsioni e gli obiettivi, in modo che l'algoritmo sia in grado di classificare i nuovi dati in arrivo con un errore minimo. Per la salute mentale, i dati sono casi noti e gli obiettivi dell'addestramento sono le diagnosi, definite dal Manuale diagnostico e statistico dei disturbi mentali, quinta edizione (DSM-5) (American Psychiatric Association (APA) 2018) o dall'equivalente dell'Organizzazione mondiale della sanità, la Classificazione internazionale delle malattie versione 11 (ICD-11) (Organizzazione mondiale della sanità 2018). Alcune forme di apprendimento automatico sono concettualmente semplici, come il K-nearest neighbors, che classifica un punto nello spazio delle caratteristiche in base ai punti di formazione a cui è più vicino. Altre, come la retropropagazione utilizzata nelle reti neurali, trattano dati molto più complessi utilizzando una serie di calcoli paralleli. In ogni caso, la matematica che permette di adattare i punti ai risultati tar-

[7] R. Freedman, D.A. Lewis, R. Michels, D.S. Pine, S.K. Schultz, C.A. Tamminga, G.O. Gabbard, *The Initial Field Trials of DSM-5: New Blooms and Old Thorns*, «American Journal of Psychiatry», 1/2013, pp. 1-5.

[8] J. Carney, *Unstable Reliability Ratings - Boycott DSM5*, «Mad In America blog», 26 marzo 2013.

[9] M.J. Owen, *Is There a Schizophrenia to Diagnose?*, «World Psychiatry», 1/2011, pp. 34-35.

get è ben definita. Tuttavia, le conseguenze dell'applicazione dell'apprendimento automatico alla salute mentale sono sismiche, a causa della collisione tra questa precisione matematica e le complessità nascoste dalle etichette diagnostiche. Alcune di queste complessità possono essere viste nel modo in cui l'aggiornamento dal DSM-4 al DSM-5 è stato criticato da tutte le professioni della salute mentale perché ha medicalizzato condizioni che in precedenza erano considerate naturali, come la depressione che può accompagnare un lutto, gli scatti d'ira nei bambini (Disruptive Mood Dysregulation Disorder) o le lievi dimenticanze in età avanzata (Minor Neurocognitive Disorder) attirando così l'attenzione sull'influenza dietro le quinte delle case farmaceutiche e portando un importante psichiatra ad avvertire che una «medicalizzazione della normalità sarebbe stata un bene per l'industria farmaceutica»[10]. Sottolineare che le diagnosi di salute mentale possono mancare di solide basi empiriche o essere soggette al pensiero di gruppo dei comitati professionali non significa affermare che la diagnosi non sia mai utile per guidare il trattamento o per convalidare le esperienze di una persona. Ma il potere dell'etichettatura psichiatrica può alterare radicalmente sia l'identità di sé, sia il modo in cui una persona viene trattata dai servizi e dalla società in generale, mentre i movimenti degli utenti sostengono che ciò che viene medicalizzato è spesso l'espressione di un disagio profondo o degli effetti di un trauma precoce come l'abuso[11].

In queste condizioni è fondamentale comprendere gli effetti della classificazione proposta dalla 'macchina'; come per esempio che le operazioni computazionali che trattano le diagnosi come dati di fatto non automatizzino semplicemente un processo di classificazione, ma costituiscano un intervento distorsivo che pone l'implacabile matematica ai ferri corti con la testimonianza dell'esperienza vissuta e la sua irriducibile pluralità[12]. Per i sostenitori dell'analisi predittiva, l'instabilità dell'etichettatura psichiatrica non è un problema, ma un'oppor-

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[10] A. Frances, *A Warning Sign on the Road to DSM-V: Beware of Its Unintended Consequence*s, «Psychiatric Times», 27 June 2009.

[11] S. Timimi, *No More Psychiatric Labels*, «Asylum Magazine», 24 May 2012.

[12] D. Mcquillan, *Mental Health and Artificial Intelligence: Losing Your Voice*, «Open Democracy», 12 November 2018.

tunità: la missione dell'apprendimento automatico è quella di fornire una psichiatria di precisione, spazzando via le dolorose contraddizioni che circondano il disagio mentale. Frustrati dal fatto che non esiste una misura di laboratorio oggettiva per i problemi di salute mentale, i sostenitori dell'analisi predittiva cercano una combinazione di fattori biologici, comportamentali e sociali, un fenotipo digitale che catturi definitivamente i diversi tipi di disfunzioni mentali, portando una precisione non solo nella classificazione ma anche una risoluzione temporale superiore all'attuale pratica clinica, identificando con una precisione simile a quella di un laser i primi segni di psicosi o di altre condizioni ben prima che vengano notati dall'individuo stesso o rilevati dai servizi sanitari.

Sfortunatamente, il sogno di precisione sembra sempre portare danni collaterali nella fase pratica, allo stesso modo in cui le armi intelligenti utilizzate negli attacchi aerei causano ancora un numero impressionante di vittime civili. Un tipo di danno collaterale che deriva dall'applicazione sociale dell'IA è la sorveglianza, la necessità di enormi quantità di dati di addestramento per ottenere una qualche precisione dagli algoritmi. Nel Regno Unito, le persone con problemi di salute mentale sperimentano già un sistema di sussidi che dà priorità al ritorno al lavoro produttivo rispetto a qualsiasi nozione di rete di sicurezza sociale. Nell'ambito di questa sfiducia istituzionalizzata, le riprese delle telecamere a circuito chiuso del supermercato Sainsbury's vengono statisticamente combinate con quelle degli abbonamenti in palestra, dei filmati degli aeroporti e dei post sui social media per suggerire che le persone mentono sulle proprie disabilità, in una politica deliberata di sorveglianza come deterrente volta a instillare ansia e interiorizzare il sospetto morale (Big Brother Watch 2018). L'ironia, naturalmente, è che il senso di iper-visibilità, di essere presi di mira, di non poter uscire per paura di essere visti come se stessero facendo qualcosa di normale, dove la retorica dello scroccone significa che essere visti giocare con i propri figli potrebbe essere usato contro di noi, può portare ulteriori livelli invalidanti di paura, ansia e paranoia in aggiunta ad altri problemi di salute mentale esistenti. E ancora, i trattamenti mirati forniti dall'IA richiederanno un monitoraggio ancora più pervasivo. Enormi volumi di dati sono indispensabili per qualsiasi apprendimento automatico, per quanto benefica sia la sua missione, per

non parlare dell'applicazione dell'IA sotto l'austerità, dove è vista come la quadratura del cerchio tra la crescente domanda e le risorse politicamente ridotte.

Riduzionismo dell'IA

Oltre a richiedere una sorveglianza sempre più pervasiva, l'applicazione dell'IA alle diagnosi psichiatriche avrà un peso notevole a favore del riduzionismo biologico.

Nella psichiatria e nella psicologia clinica i tradizionali disturbi mentali sono comunemente definiti come disturbi cerebrali. Per quanto complessi siano i fenomeni osservati e per quanto sembrino invocare un senso, la sensazione è che possano essere ricondotti a disfunzioni della materia grigia. Tuttavia, questa convinzione che i problemi di salute mentale siano disturbi cerebrali non è stata accompagnata dalla capacità delle neuroscienze di individuare i problemi. Nonostante decenni di sforzi, non esistono marcatori biologici definitivi per le condizioni psichiatriche comuni[13]. È difficile trovare definizioni dettagliate di come i disturbi mentali siano esattamente disturbi cerebrali e, sebbene gli studi che utilizzano le neuroimmagini come la risonanza magnetica funzionale siano pieni di correlazioni tra l'attività cerebrale e le diagnosi del DSM, non rivelano se si tratti di cause, effetti o epifenomeni. Almeno alcune delle meraviglie di rendere visibile il funzionamento del cervello tramite la risonanza magnetica sono illusorie; una meta-analisi condotta nel 2017 su centinaia di studi di risonanza magnetica che hanno coinvolto migliaia di partecipanti non ha mostrato differenze cerebrali consistenti tra schizofrenia, disturbo bipolare, disturbo depressivo maggiore, disturbi d'ansia e disturbo ossessivo compulsivo. Di conseguenza, mette in guardia dall'attribuire un'eccessiva specificità ai cambiamenti funzionali del cervello quando si formano modelli esplicativi dei disturbi psichiatrici[14]. Sebbene al-

[13] E. Fried, *All Mental Disorders Are Brain Disorders ... Not*, «Eiko Fried blog», 6 January 2018.

[14] E. Sprooten, A. Rasgon, M. Goodman, A. Carlin, E. Leibu, W. Hee Lee, S. Frangou, *Addressing Reverse Inference in Psychiatric Neuroimaging: Meta-Analyses*

cuni di questi problemi possano derivare da incongruenze diagnostiche, la fMRI ha anche i suoi problemi di affidabilità dei biomarcatori a livello individuale[15] e fa parte del più ampio fenomeno di 'crisi della riproducibilità' nella scienza a causa di problemi di p-hacking (in cui i campioni vengono selezionati per produrre risultati statistici apparentemente significativi)[16]. La contro-narrazione suggerisce che i problemi di salute mentale non hanno origine all'interno del cervello, ma sono la risposta della mente a traumi, abusi o angosce[17]. Le ricerche dimostrano, ad esempio, che le avversità infantili aumentano il rischio di psicosi[18]. Per quanto riguarda la depressione e il PTSD, ad esempio, i risultati sono che gli eventi avversi della vita spiegano circa due ordini di grandezza in più della varianza rispetto ai fattori biologici.

In questa ambiguità di fattori biologici e sociali si inserisce la cosiddetta 'psichiatria di precisione', che promuove concetti di disturbi mentali non come lesioni, ma come disturbi dei circuiti cerebrali che possono essere identificati attraverso gli strumenti della genetica, delle neuroscienze e dei dati digitali[19]. La psichiatria intelligente analizza i dati digitali di tutti i giorni che presumibilmente forniscono indizi sul comportamento, sulla cognizione e sull'umore, che si tratti di cambiamenti nella velocità di battitura, nell'attività fisica, nel tono di voce o nella forma delle parole che usiamo su Twitter, utilizzando le possibilità dello smartphone, mediate dalla lente gravitazionale dell'intel-

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of Task-Related Brain Activation in Common Mental Disorders, «Human Brain Mapping», 4/2017, pp. 1846-1864.

[15] J.H. Fröhner, V. Teckentrup, M.N. Smolka, N.B. Kroemer, *Addressing the Reliability Fallacy: Similar Group Effects May Arise from Unreliable Individual Effects*, «Neuroimage», 195/2017, pp. 174-189.

[16] C. Pernet, J.B. Poline, *Improving Functional Magnetic Resonance Imaging Reproducibility*, «GigaScience», 4/2015, pp. 1-8.

[17] P. Kinderman, *Why We Need to Abandon the Disease-Model of Mental Health Care*, «Scientific American Blog Network», 17 November 2014.

[18] F. Varese, F. Smeets, M. Drukker, R. Lievers, T. Lataster, W. Viechtbauer, J. Read, J. Van Os, R.P. Bentall, C*hildhood adversities increase the risk of psychosis: a meta-analysis of patient-control, prospective- and cross-sectional cohort studies*, «Schizophr Bull», 4/2012, pp. 661-671.

[19] P. Dagum, *Digital Phenotyping in Mental Health*, intervista presentata alla National Alliance in Mental Health Convention 2017, Washington DC, 30 giugno 2017.

ligenza artificiale, per rivelare le perturbazioni più profonde del nostro cervello.

La capacità dell'apprendimento automatico di lavorare con dati eterogenei, che spaziano dai grafi sociali ai sensori di inclinazione, non viene utilizzata per ampliare la nostra prospettiva, ma per separare le cause sociali dal disagio e, come un GPS neurale, localizzarne le origini nelle nostre strutture corticali.

L'effetto di questo intervento digitale nella questione mente-corpo non è semplicemente quello di sostenere un'epistemologia riduttiva, ma di partecipare al divenire dell'umano, i cui confini sono sempre co-costruiti dagli strumenti del tempo. La posta in gioco non è solo la colonizzazione algoritmica della mente, ma il modo in cui l'epoca dell'IA disegna i confini del naturale.

Le domande su ciò che costituisce il corpo e la mente umana, sulla loro composizione e sui loro limiti, sono sempre attenuate dalle pratiche tecniche a nostra disposizione. I geni, come oggetti contemporanei di conoscenza di sé, dipendono per la loro concretezza dai meccanismi della tecnoscienza distribuita: sequenziatori, biobanche, banche dati, algoritmi, istituzioni e internet. Allo stesso modo, i fenotipi digitali del disagio mentale verranno ad esistere attraverso l'impilamento verticale della diagnosi psichiatrica con gli smartphone e gli algoritmi delle reti neurali artificiali, e il substrato dei microprocessori GPU in grado di eseguire calcoli massivamente paralleli in tempi fattibili[20]. Invece delle fantasie dei transumanisti della Silicon Valley, secondo cui le nostre menti saranno caricate sul cloud e quindi sfuggiranno ai vincoli della fisicità, i circuiti dell'analisi dei dati si stanno invece fondendo con i nostri cervelli incarnati.

Il complesso computazionale-psichiatrico costruisce spiegazioni autorevoli dei nostri comportamenti incatenando ipotesi riduttive sulla mente alle correlazioni dell'apprendimento automatico. Questo tentativo di costruire un complesso computazionale-psichiatrico non avviene nel vuoto, ma è parallelo al campo emergente della sociogenomica che, cercando di salvare il potere esplicativo della genetica sposandolo con i big data, ha fatto riemergere alcuni pregiudizi

[20] F. Shaikh, *Why Are GPUs Necessary for Training Deep Learning Models?*, «Analytics Vidhya blog», 18 May 2017.

suprematisti della scienza che si pensava fossero tranquillamente sepolti nella storia.

Nonostante le promesse che hanno accompagnato la corsa al sequenziamento del genoma umano, il fatto scomodo è che poche malattie comuni possono essere attribuite a singoli geni. Per questo motivo, sono in corso studi sull'intero genoma di grandi gruppi di persone alla ricerca di modelli di variazioni in un milione di polimorfismi a singolo nucleotide, o SNP, in un processo noto come studi di associazione genome-wide (GWAS)[21]. L'idea è quella di trovare correlazioni tra questi modelli e tratti fenotipici osservabili. Se si riesce a trovare un modello statistico, il genoma di qualsiasi individuo successivo può essere confrontato con esso per generare una gradazione di rischio poligenico[22]; la probabilità predittiva che quella persona abbia o sviluppi il tratto. Utilizzando dati provenienti da archivi pubblici e da aziende di genomica di consumo come 23andMe, gli studi GWAS hanno trovato modelli di SNP associati a una serie vertiginosa di tratti. L'elenco della Biobanca del Regno Unito, per esempio, comprende risultati relativi al cancro e ad altre malattie, ma anche correlazioni genetiche legate ad altri aspetti della vita sociale come i turni di lavoro in azienda, ma anche il tempo trascorso alla guida ecc., e naturalmente modelli apparentemente associati a depressione, ansia e schizofrenia (The Neale Lab 2018).

Come l'apprendimento automatico, la sociogenomica si basa sulla correlazione piuttosto che sulla causalità. Sebbene la presenza di queste correlazioni suggerisca che questi tratti possano essere ereditabili, i professionisti più sobri sottolineano che anche se qualcosa è in qualche modo ereditabile, le differenze ambientali e culturali sono spesso i principali fattori di differenza[23]. Anche se una parte della differenza fenotipica può essere attribuita a punteggi poligenici, non significa che un tratto sia immutabile o naturale, poiché molti fenotipi sono modificabili. Inoltre, la cosa più critica è che le variazioni identifica-

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[21] J.S. Witte, *Genome-Wide Association Studies and Beyond*, «Annual Review of Public Health», 31/2010, pp. 9-20.

[22] F. Dudbridge, *Power and Predictive Accuracy of Polygenic Risk Scores*, «PLOS Genetics», 3/2013.

[23] G. Coop, *Polygenic Scores and Tea Drinking*, «Gcbias blog», 14 March 2018.

te sono spesso piccole, una questione di pochi punti percentuali, così che i fattori ambientali e culturali le sovrastino in ordine di importanza. Eppure alcuni scienziati sono propensi a citare i GWAS come basi genetiche di fenomeni sociali complessi, promuovendo l'idea di pagelle che predicono i rischi non solo di varie malattie, ma anche le propensioni a comportamenti futuri come la fedeltà coniugale o la prudenza finanziaria[24].

Alcuni studiosi come Robert Plomin, insistono sul fatto che «individual differences in income are, like everything else, substantially heritable, about 40 percent. Income correlates with intelligence, and genetics drives this correlation»[25]. La giustificazione del diritto, che è vecchia come il cucco, viene trasformata dalla sua nozione di 'ricchezza genetica' in una sorta di neoliberismo genomico, in cui gli SNP sono gli elementi di un meccanismo di libero mercato che produrrà necessariamente il risultato ottimale. Nel frattempo, il cosiddetto movimento per la biodiversità umana, che fa parte della più ampia famiglia della destra politica, sfrutta gli studi GWAS per affermare una base scientifica per le disuguaglianze razziali e utilizza la nozione di 'realismo razziale' per giustificare il razzismo come ragionevole ed empirico. Ricordiamo che tali visioni distorte possono diventare parte dell'apparato sociale. All'inizio del XX secolo, le idee eugenetiche portarono ad alcune leggi negli Stati Uniti contro la *miscegenation* (la mescolanza di gruppi razziali diversi attraverso il matrimonio o le relazioni sessuali) e furono alla base della politica di sterilizzazione dei 'non idonei'.

Francis Galton, il cugino di Darwin che coniò il termine eugenetica, credeva che il progresso della civiltà dipendesse dall'eliminazione dei deboli. Nell'ambito di una ricerca su una popolazione sedentaria, sviluppò il concetto di correlazione matematica, che divenne un pilastro centrale della statistica. Il suo seguace eugenista Karl Pearson creò il concetto di coefficiente di correlazione[26]. Naturalmente, il con-

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[24] N. Comfort, *Nature still battles nurture in the haunting world of social genomics*, «Nature», 553/2018, pp. 278-280.

[25] R. Plomin, *Blueprint: Come il DNA ci rende ciò che siamo*, Allen Lane ed., Londra 2018.

[26] N. Comfort, *Sociogenomics Is Opening a New Door to Eugenics*, «MIT Technology Review», 23 October 2018.

cetto di correlazione e il coefficiente di correlazione hanno trasceso la loro origine per diventare parte dell'analisi numerica generale, con la stessa probabilità di essere applicati a favore della giustizia sociale o contro di essa. Ma in una congiunzione di suprema ironia storica, questi metodi statistici sono il nucleo matematico dell'apprendimento automatico e rischiano di essere iscritti in forme distorte di selezione sociale, in modo tale che la matematica nata accanto all'eugenetica si ricongiunga ad essa attraverso l'IA.

La scienza da sola non è il baluardo che potremmo sperare contro questi sviluppi. Come sottolineano Sandra Harding e altri, il suo modello di oggettività è efficace nel controllo incrociato tra gli esperimenti, ma è miope nell'identificare i pregiudizi della cultura[27]. Tuttavia, la scienza rivendica per sé il potere di squalificare altre modalità di spiegazione e, inserita in asimmetrie istituzionali di potere, i giudizi algoritmici erediteranno questa autorità.

Le decisioni istituzionali si baseranno su metriche predittive come quelle del sistema di protezione dei minori della contea di Allegheny[28] o delle classifiche di valutazione degli insegnanti di Washington D.C.[29]. Sia che si basino sulla sociogenomica o sui fenotipi digitali, le analisi predittive acquisteranno forza di legge anche quando non saranno esplicitamente previste, soprattutto quando faranno parte di cicli chiusi come il ciclo di previsione-intervento-monitoraggio della psichiatria di precisione. Assumere che le persone non siano dei fogli bianchi non equivale ad affermare un ordine naturale, né l'esistenza di differenze tra i cervelli equivale a dire che queste sono il fattore più importante per la salute mentale, ma sedimentare queste domande sotto l'opacità algoritmica porterà alla loro promozione attraverso stati di eccezione[30]. I presupposti riduzionistici incorporati nei sistemi di apprendimento automatico, che a loro volta sono incor-

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[27] S. Harding, *Rethinking Standpoint Epistemology: What Is "Strong Objectivity"?*, Routledge, Londra 2004.

[28] V. Eubanks, *A Child Abuse Prediction Model Fails Poor Families*, «Wired», 15 gennaio 2018.

[29] W. Rinehart, *Book Review: Cathy O'Neil's 'Weapons of Math Destruction'*, «Technology Liberation Front», 7 November 2018.

[30] D. McQuillan, *Algorithmic States of Exception*, «European Journal of Cultural Studies», 4-5/2015, pp. 564-576.

porati nelle urgenze dei servizi di prima linea, renderanno operativi la prelazione, l'esclusione e la detenzione.

Psicopolitica dell'apprendimento automatico

Il target delle persone selezionate attraverso biomarcatori digitali, sostenuto da ipotesi 'biologizzanti' sui disturbi cerebrali, rafforza una visione riduzionista secondo cui i problemi di salute mentale sono una propensione innata, una maledizione individuale. La cosiddetta 'psichiatria dell'IA' diventa una cortina di fumo high-tech che oscura i fattori sociali, come i traumi emotivi e psicologici e gli effetti devastanti della precarietà, della povertà e della mancanza di una casa. Le scosse di assestamento dell'austerità spingono un numero sempre maggiore di persone in condizioni disperate, aggravate da un sistema di sussidi punitivo che incolpa anche l'individuo, producendo indebitamento e disperazione. Il tributo alla salute mentale di questo sistema è visibile nei suicidi di persone che si sono viste negare i sussidi di invalidità[31]. Nel suo rapporto sulla Gran Bretagna, il relatore delle Nazioni Unite sulla povertà estrema e i diritti umani ha concluso che l'austerità non è la causa diretta, ma la copertura di una riduzione rivoluzionaria dei livelli di equità e giustizia sociale, che equivale a uno smantellamento del contratto sociale:

> Compassion for those who are suffering has been replaced by a punitive, mean-spirited, and often callous approach apparently designed to instill discipline where it is least useful, to impose a rigid order on the lives of those least capable of coping with today's world, and elevating the goal of enforcing blind compliance over a genuine concern to improve the well-being of those at the lowest levels of British society[32].

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[31] B. Barr, D. Taylor-Robinson, D. Stuckler, R. Loopstra, A. Reeves, M. Whitehead, *'First, Do No Harm': Are Disability Assessments Associated with Adverse Trends in Mental Health? A Longitudinal Ecological Study*, «Journal of Epidemiol Community Health», 4/2016, pp. 339-345.

[32] P. Alston, *Statement on Visit to the United Kingdom*, United Nations Special Rapporteur on Extreme Poverty and Human Rights, 16 November 2018.

Egli individua nell'automazione e nell'IA il fulcro di questa intensificazione della strategia governativa, attraverso l'analisi completamente automatizzata dei rischi e il ricalcolo in tempo reale di sussidi e sanzioni; una mobilitazione algoritmica del mantra di Margaret Thatcher secondo cui 'la società non esiste'[33]. Eppure sappiamo già che, quando si parla di benessere, i determinanti sociali superano quelli biologici. La ricerca suggerisce che l'impatto maggiore sui risultati della salute mentale deriva da fattori esterni al trattamento, come le circostanze sociali e i livelli di supporto di una persona. Invece di permettere all'IA di definire come unica opzione gli interventi miranti a obiettivi individualizzati, dovremmo chiederci se possiamo ripensare i nostri metodi algoritmici in modo che riducano i fattori di rischio sociale e creino beni pubblici che aumentino il benessere delle comunità, perché la prevenzione piuttosto che la prelazione implica la crescita dell'intera popolazione.

La tecnologia, come la scienza, è allo stesso tempo il prodotto della matrice sociale e ne è costitutiva. Non solo agisce nel mondo, ma riflette una visione collettiva di ciò che è possibile e desiderabile, che Sheila Jasanoff ha definito immaginario sociotecnico[34]. Le speranze e le paure di una cultura sono legate ai suoi mezzi di conoscenza, un processo in costante evoluzione, poiché tecnologie come la genetica e la computazione ereditano una storia, ma indicano modi diversi per raggiungere futuri promettenti. L'immaginario sociotecnico lega insieme il nostro senso di ciò che è e di ciò che dovrebbe essere, co-producendo significati sulla natura del mondo e sul nostro posto nella società che durano perché sono eseguiti collettivamente, ma che mutano quando emergono nuove possibilità.

Contestando la visione psichiatrica della salute mentale, il movimento degli utenti e dei sopravvissuti ha già mostrato la possibilità di un'articolazione dal basso verso l'alto del sapere e di una diversa visione di ciò che è desiderabile, mobilitandosi intorno ai poli del trau-

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[33] Si veda M. Thatcher, *Aids, Education and the Year 2000*, interwove for Woman's Own, 23 September 1987.

[34] Sull'argomento, cfr. S. Jasanoff, K. Sang-Hyun, *Dreamscapes of Modernity: Sociotechnical Imaginaries and the Fabrication of Power*, University of Chicago Press, Chicago-London 2015.

ma, dell'abuso e del disagio piuttosto che della malattia e della patologia, e sviluppando strategie di self-help come la "minimizzazione del danno"[35]. La necessità di una psicopolitica alternativa della salute mentale è intensificata dalle nuove forme di conoscenza neurale e dal nascente divenire di un complesso psichiatrico-computazionale. C'è un bisogno sociale e politico di pratiche alternative, basate sui valori e sui principi della solidarietà e dell'aiuto reciproco, che spingano una controcultura dell'IA attraverso tutti i suoi strati di infrastrutture, dati, algoritmi e statistiche. Non si tratta di una questione urgente solo per la salute mentale, poiché lo schema del riduzionismo sostenuto dall'IA si ripeterà in tutta la sanità, l'assistenza sociale e il sistema giudiziario. Il vero pregiudizio dell'apprendimento automatico è il modo in cui distorcerà l'immaginario sociotecnico attraverso la coscienza degli spettatori abilitata dalle GPU. Piuttosto che affidarci alla rappresentazione di esperienze incommensurabili tramite vettori computazionali, abbiamo bisogno di nuove pratiche algoritmiche che mettano in discussione le risonanze generate tra le distanze vettoriali e le differenze sociali, e che svincolino l'ottimizzazione della rete neurale dall'ottimizzazione neoliberale dei mercati. Queste pratiche tecniche critiche possono essere realizzate solo con l'inclusione dei diretti interessati.

Ripensare la psicopolitica dell'apprendimento automatico significa lavorare contemporaneamente con la programmazione e la politica, risolvendo problemi tecnici e mantenendo l'attenzione sull'impatto sociale, un processo che non è né ingegneria né politica sociale. Richiede sia precisione a livello matematico sia apertura verso le diverse realtà possibili. Un approccio è offerto dal modello di scienza femminista elaborato da Roy, Spanier e Harding[36], per esempio, che amplia la metodologia scientifica come modalità di indagine per includere (1) la localizzazione delle origini della problematica, (2) la scoperta degli scopi dell'indagine e (3) l'instaurazione di una relazione tra il ricercatore e il suo oggetto di indagine. Coloro che de-

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[35] M. Cresswell, H. Spandler, *Psicopolitica: Peter Sedgwick's Legacy for the Politics of Mental Health*, «Social Theory & Health», 2/2009, pp. 129-147.

[36] D. Roy, *Feminist Theory in Science: Working Toward a Practical Transformation*, «Hypatia», 1/2004, pp. 255-279.

siderano sviluppare un apprendimento automatico non oppressivo non devono accettare un problema come dato di fatto, ma devono iniziare a localizzarne le origini; in altre parole, devono diventare consapevoli delle forze strutturali che lo hanno reso prioritario e di ciò che la sua formulazione rivela sull'algebra sociale del potere. Scoprire gli scopi dell'apprendimento automatico significa andare oltre la previsione accurata dei dati di validazione attraverso l'ottimizzazione degli iper-parametri. Significa considerare questo ristretto scopo tecnico come parte di un insieme più ampio di impatti, chiedendosi a chi servirà, chi potrebbe escludere e come influirebbe sul benessere più ampio della società. Forse l'aspetto più radicale per l'apprendimento automatico è che questa metodologia femminista stabilisce una relazione tra chi indaga e il suo oggetto d'indagine, richiedendo di mettere volutamente da parte la coscienza di spettatore che alimenta l'arroganza dell'IA. Il modo più diretto per mettere in pratica questo metodo femminista con l'apprendimento automatico è attraverso strutture collettive di ricerca che includano il 'target group' nel processo di indagine. Il nuovo apprendimento automatico deve combinarsi con una pedagogia critica collegata a sua volta a pratiche tecniche critiche.

Conclusioni

Le questioni sollevate dall'IA nel periodo dell'austerità non sono fatte di filosofie astratte su come vivere con le macchine pensanti, ma si concentrano sui modi in cui le operazioni concrete saranno iscritte dalla politica punitiva e sulla necessità di immaginare alternative che risuonino con la liberazione. Il complesso computazionale-psichiatrico sarà uno dei tanti che nasconde accomodamenti repressi a ogni livello, dalle categorie sociali all'analisi dei dati all'elaborazione dei segnali, piegando le dimensioni del politico fuori dalla vista. Sappiamo già che il modernismo dualistico del nostro immaginario sociotecnico ha un cuore oscuro; che alcune iterazioni del suo dispiegamento tecnico-sociale sostengono le malefatte su scala, sia attraverso la craniometria del colonialismo sia attraverso le macchine Hollerith del nazional-

socialismo[37]. È particolarmente pericoloso "biologizzare" l'angoscia in un periodo di ascesa della politica di estrema destra; una politica che esprime ciò che Roger Griffin chiama ultranazionalismo palingenetico, cercando di porre fine alla degenerazione della nazione e di provocare la sua imminente rinascita dalla decadenza attraverso la xenofobia razionalizzata e l'etnocentrismo biologicamente determinista[38].

Ma anche quando avremo rifiutato la rivalutazione dell'eugenetica e ucciso di nuovo il fascismo, dovremo continuare a contestare i confini del politico e del naturale. Come ci ha ricordato Donna Haraway, «the point is to learn to remember that we might have been otherwise and might yet be, as a matter of embodied fact»[39]. Forme calcolatrici, come l'IA e la sociogenomica, si stanno sedimentando nelle nostre società; dato che l'apprendimento automatico incanala questi cambiamenti, abbiamo urgentemente bisogno di un rinnovamento strutturale dell'apprendimento automatico stesso attraverso un'agenzia collettiva di empatia e solidarietà, l'applicazione di metodi femministi e un impegno al mutuo soccorso antifascista.

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[37] E. Black, *IBM e l'Olocausto: The Strategic Alliance Between Nazi Germany and America's Most Powerful Corporation-Expanded Edition*, Dialog press, Washington D.C. 2012.

[38] R. Griffin, *The Palingenetic Core of Fascist Ideology*, in A. Campi (a cura di), *Che cos'è il Fascismo? Interpretazioni e prospettive di ricerca*, Ideazione editrice, Roma 2003, pp. 97-122.

[39] D.J. Haraway, *Modest_Witness@Second_Millennium.FemaleMan_Meets_OncoMouse: Feminism and Technoscience*, Routledge, Londra 1997.

Variazioni etiche nel dialogo con Nao. Esplorazioni della moralità umana nell'interazione con i robot sociali[1]

Alessandro D'Oronzo, Marta Vitale

Introduzione

Sebbene quello dell'interazione uomo-robot (HRI), ambito di studi trasversale che attira l'attenzione di studiosi delle più varie discipline, sia un campo di ricerca relativamente recente, è possibile individuarne una storia sulla scorta dell'evoluzione progettuale e della realizzazione delle tecnologie applicate alle macchine. Se una certa categoria di robot autonomi aveva trovato – e trova – applicazione in ambiti in cui l'interazione con gli umani era limitata al controllo delle macchine da remoto (ad esempio, tra gli altri, nei robot per la rimozione delle mine, per il controllo di pozzi di petrolio, per l'esplorazione spaziale), i robot di servizio introducono l'interazione in spazi umani anche di rilievo – si pensi, per inciso, non solo ai robot tagliaerba o ai robot aspirapolvere, ma anche ai robot che portano i pasti negli ospedali. Una nuova generazione di robot, tuttavia, quella dei robot sociali umanoidi, aventi cioè fattezze umane, vede implementata una certa capacità sociale che risiede in dinamiche comunicative che imitano l'ironia e la fluidità del discorso, e che tentano di perfezionare l'adeguamento della risposta del robot alla domanda dell'umano e al contesto sociale in cui avviene l'interazione. A questo va aggiunta la ricerca sull'implementazione di capacità assistenziali mirate e complesse, il successo delle quali è collocato nella capacità dei robot di adattarsi alle esigenze e all'emotività umana, oltre che a fornire informazioni utili e affidabili[2].

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[1] In questo lavoro il primo, il terzo ed il quinto paragrafo sono stati realizzati da Alessandro D'Oronzo, il secondo, il quarto e il sesto da Marta Vitale. Entrambi gli autori hanno contribuito a pari merito alla sperimentazione.

[2] C. Breazeal, *Social Interactions in HRI: The Robot View*, «Transactions on Systems, Man, and Cybernetics—Part C: Applications and Reviews», 34/2004, pp. 181-186.

Tra i modelli di robot sociali oggi più diffusi emerge il Nao, robot umanoide di piccole dimensioni sviluppato dalla società francese Aldebaran-Robotics. Nello specifico, l'implementazione di funzioni quali camminare, parlare, ascoltare, esprimere gestualità emotive, riconoscere volti e gesti, interagire con altri robot simili, e la dotazione di sensori, suoni e led, lo rendono idoneo per lo studio delle dinamiche di interazione con gli umani in contesti sociali definiti.

L'interazione con i robot sociali umanoidi solleva sfide etiche del tutto inedite legate alla responsabilità, alla privacy, alla sicurezza e alla moralità delle azioni e delle decisioni del robot e dell'individuo[3]. La filosofia morale e la psicologia accolgono queste sfide fornendo agli studiosi strumenti indispensabili per affrontarle. Ma quale modello di moralità – e quali strumenti ad esso collegati – è utile sostenere e utilizzare nel porsi di fronte (o accanto) ad esse?

La complessità della dimensione morale umana è indagata – in forma mai definitiva per la costituzione stessa dell'oggetto di ricerca – da una serie di teorie filosofiche e psicologiche aventi approcci, metodologie e intuizioni differenti. Il novero degli elementi costitutivi della moralità – modalità del pensiero morale, valori che vengono percepiti come fondamentali, emotività – lungi dall'essere stabiliti una volta per tutte nella vita degli individui, si sviluppano e cambiano nel tempo, condizionati come sono anche dal contesto sociale mutevole. In più, la disposizione a seguire i valori fondamentali non sempre conduce ad un'azione ad essi coerente[4]. La condotta morale è non solo non assoluta, ma anche potenzialmente contraddittoria.

Gli studi condotti da Bandura[5] inseriscono la concezione della natura e della funzione della moralità nel quadro della più vasta teoria socio-cognitiva dell'*agency* morale. Il concetto di *agency* si riferisce alla capacità degli individui di influenzare attivamente gli eventi e di produrre effetti nel mondo circostante. Questa capacità si manifesta

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[3] A. Amirova, N. Rakhymbayeva, E. Yadollahi, A. Sandygulova, W. Johal, *10 Years of Human-NAO Interaction Research: A Scoping Review*, «Frontiers in Robotics and AI», 8/2021, pp. 67-92.

[4] S. Caravita, G. Gini, *L'(im)moralità del bullismo*, Unicopli, Milano 2010, pp. 80-95.

[5] A. Bandura, *Moral Disengagement in the Perpetration of Inhumanities*, «Personality and Social Psychology», 3/1999, pp. 190-209.

attraverso processi cognitivi e comportamentali quali il pensiero anticipatorio, l'auto-regolazione e l'auto-riflessione. Quest'ultimo, declinato secondo le polarità morali del bene e del male, del giusto e dello sbagliato, necessita l'estrazione, la valutazione e l'integrazione di informazioni moralmente rilevanti per giustificare le proprie azioni in diverse situazioni. L'agency umana implica, dunque, anche la riflessione sul comportamento che si è tenuto e sulle conseguenze morali delle azioni realizzate[6].

Le situazioni moralmente complesse possono essere così ambigue da consentire una flessibilità interpretativa, che a volte porta gli individui a negare la propria responsabilità, a incolpare le vittime e a minimizzare l'importanza delle proprie azioni. Questo comportamento è noto come disimpegno morale. Il disimpegno morale è un processo psicologico che fa parte del sistema di auto-regolazione descritto da Bandura. Esso consiste nella selezione di standard morali che consentono di compiere azioni immorali e antisociali senza provare sensi di colpa o rimorso, e si basa su una serie di meccanismi cognitivi che alterano la percezione della realtà e giustificano comportamenti contrari alla morale. Bandura[7] ne ha identificati otto: (i) giustificazione morale; (ii) etichettatura eufemistica; (iii) confronto vantaggioso; (iv) spostamento di responsabilità; (v) diffusione di responsabilità; (vi) disprezzo o distorsione delle conseguenze; (vii) deumanizzazione; (viii) attribuzione di colpa.

Partendo da questo quadro teorico, il presente contributo si propone di avanzare una sperimentazione che, interrogandosi sulle dinamiche dell'interazione uomo-robot, possa offrire ulteriori spunti di riflessione sulla consapevolezza individuale dei valori morali personali, preludio alle dinamiche di disimpegno. In particolare, l'interazione con un robot su questioni etiche può determinare una differenza significativa nella riflessione sui valori morali – anche nell'ottica di una maggiore sincerità – rispetto all'interazione con un essere umano sugli stessi argomenti? La risposta a questa domanda potrebbe venire dalla

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[6] A. Bandura, *Moral Disengagement. How People Do Harm and Live with Themselves*, Worth Publishers, New York 2016.

[7] A. Bandura, *Selective Moral Disengagement in the Exercise of Moral Agency*, «Moral education», 31/2002, pp. 102-116.

somministrazione di un questionario psicometrico sui princìpi morali da parte di un robot sociale e di un essere umano a campioni distinti di volontari[8]. Inoltre, se l'interazione con un robot influisce sulla sincerità del discorso sui valori morali personali, a quale livello di interazione si manifesta questa differenza? È possibile, infatti, che l'interazione avvenga indirettamente tramite un video, oppure direttamente, in presenza.

La sperimentazione che qui descriviamo si sviluppa lungo due direttrici – quella umano/robot e quella maggiore/minore interazione – e si articola nelle seguenti fasi:

1) Scelta del questionario psicometrico e sua traduzione in italiano;
2) Implementazione del questionario su robot Nao mediante il software Choregraphe;
3) Selezione dei due campioni di volontari;
4) Somministrazione del questionario da parte del Nao e da parte di un umano secondo il grado di interazione stabilito;
5) Confronto dei dati.

Essa si pone come un semplice esempio tra i molti possibili di come l'interazione uomo-robot possa fare luce su aspetti che riguardano, più che le tecnologie, l'essere umano, l'autocomprensione dei processi morali e le dinamiche dell'agire sociale e politico.

Contesto, traduzione, contenuto e funzionamento del Moral foundation questionnaire

La psicologia morale si occupa dello studio dei processi attraverso i quali gli individui elaborano – dal punto di vista cognitivo, emotivo e sociale – il loro agire morale. La Teoria dei fondamenti morali (MFT) si colloca in questo contesto disciplinare. Essa considera il comportamento morale come emergente dall'interazione tra una serie di sistemi

[8] La sperimentazione qui proposta è stata ideata e in parte realizzata nel corso dei nostri studi al Master in *Intelligenza artificiale per le scienze umane* dell'Università Federico II di Napoli, i cui docenti ringraziamo.

cognitivi distinti e autonomi, sviluppatisi per risolvere problemi sociali ricorrenti[9], e si basa su tre pilastri concettuali:

(i) L'agire morale emerge da processi intuitivi, e le giustificazioni verbali fungono da spiegazioni post-hoc per decisioni istintive;
(ii) la moralità è multidimensionale, basata su diversi fondamenti o valori;
(iii) l'importanza attribuita alle diverse dimensioni morali varia da individuo a individuo[10].

Nel loro studio intitolato *Intuitive Ethics: How Innately Prepared Intuitions Generate Culturally Variable Virtues*[11], Jonathan Haidt e Craig Joseph hanno identificato cinque fondamenti morali che costituiscono la base delle intuizioni etiche innate: cura/compassione, giustizia/uguaglianza, fedeltà/gruppo, autorità/rispetto e purezza/sacralità. Per esplorare quanto i giudizi morali individuali si allineino a queste cinque dimensioni fondamentali, è stato sviluppato il Moral foundation questionnaire (MFQ). Sebbene il questionario si concentri sui giudizi morali personali, la MFT ne indaga la condivisibilità a livelli più ampi, come quelli di gruppo, della società o di un'intera cultura[12].

La chiarezza delle affermazioni in esso contenute, la pertinenza con i temi della nostra indagine, la presenza di letteratura scientifica a sostegno della sua validità e la semplicità del suo utilizzo, hanno guidato la scelta della scala psicometrica per la nostra sperimentazione sul MFQ[13]. Ideato in lingua inglese e da noi tradotto in italiano utilizzan-

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[9] M. Zakharin, T.C. Bates, *Remapping the foundations of morality: Well-fitting structural model of the Moral Foundations Questionnaire*, «Plos One», 22/2021, https://doi.org/10.1371/journal.pone.0303714.

[10] J. Haidt, C. Joseph, *Intuitive ethics: How Innately prepared intuitions generate culturally variable virtues*, «Daedalus», 133/2004, pp. 55-66.

[11] Ibid.

[12] A. Bobbio, A. Nencini, M. Sarrica*, Il Moral Foundation Questionnaire: Analisi della struttura fattoriale della versione italiana*, «Giornale di Psicologia», 5/2011, pp. 7-18.

[13] In particolare, è stata qui utilizzata la versione del Moral foundation questionnaire (MFQ30) creata da Graham e colleghi. Aggiornato per l'ultima volta nel luglio 2008, è disponibile sul sito *moralfoundations.org*.

do forme linguistiche funzionali alla sua esposizione da parte del robot sociale, il MFQ calcola un punteggio medio che riflette il livello di adesione dell'individuo a ognuno dei fondamenti morali. Il questionario si divide in due sezioni, ciascuna comprendente 15 domande e una domanda di controllo. La prima sezione, denominata "rilevanza morale", valuta le opinioni esplicite degli individui su ciò che considerano moralmente importante, utilizzando una scala Likert a sei punti che va da 0 (per niente rilevante) a 5 (estremamente rilevante). La seconda sezione, "giudizio morale", misura come i fondamenti morali vengono effettivamente applicati nel giudizio morale, anch'essa con una scala Likert a sei punti che va da 0 (fortemente in disaccordo) a 5 (fortemente d'accordo). L'introduzione alla prima parte del questionario è stata formulata come segue: «Quando decidi se qualcosa è giusto o sbagliato, quanto sono importanti le seguenti considerazioni nella tua riflessione? Dai un valore agli elementi con dei numeri da 0 (per niente importante) a 5 (estremamente importante)». Essa si riferisce alle domande:

1. Quanto è importante per te se qualcuno soffre o no emotivamente?
2. Quanto è importante per te se alcune persone vengono trattate in maniera diversa rispetto ad altre?
3. Quanto è importante per te se l'azione di qualcuno mostra amore per la sua nazione?
4. Quanto è importante per te se qualcuno mostra una mancanza di rispetto per l'autorità?
5. Quanto è importante per te se qualcuno viola gli standard di decenza e decoro?
6. Quanto è importante per te se qualcuno è bravo in matematica?
7. Quanto è importante per te se qualcuno si prende cura per qualcuno di malato o vulnerabile?
8. Quanto è importante per te se qualcuno agisce in modo ingiusto?
9. Quanto è importante per te se qualcuno ha fatto qualcosa per tradire il suo gruppo?
10. Quanto è importante per te se qualcuno si conforma alla tradizione della società?

11. Quanto è importante per te se qualcuno fa qualcosa di disgustoso?
12. Quanto è importante per te se qualcuno è crudele?
13. Quanto è importante per te se a qualcuno sono negati i suoi diritti?
14. Quanto è importante per te se qualcuno mostra una mancanza di lealtà?
15. Quanto è importante per te se un'azione causa caos o disordine?
16. Quanto è importante per te se qualcuno agisce in modo che Dio l'approverebbe?

La seconda parte, invece, viene introdotta con: «Grazie per le risposte che hai dato fino ad ora. Passiamo alla seconda parte del test, che consiste in altre sedici affermazioni rispetto alle quali ti chiedo, come prima, di dare un valore da zero a cinque in base a quanto ti trovi d'accordo. Tutto chiaro?», ed è costituita dalle seguenti affermazioni:

1. La compassione per chi soffre è la virtù più importante;
2. Quando i governi promulgano leggi, il principio fondamentale dovrebbe essere l'assicurarsi che tutti vengano trattati equamente;
3. Sono orgoglioso della storia del mio paese;
4. Il rispetto per l'autorità è una cosa che tutti i ragazzi devono imparare;
5. Le persone non dovrebbero fare cose disgustose, anche se nessuno ne viene danneggiato;
6. È meglio fare il bene che il male;
7. Una delle cose peggiori che una persona possa fare è danneggiare un animale indifeso;
8. La giustizia è uno dei requisiti più importanti per una società;
9. Le persone dovrebbero essere leali con i membri della propria famiglia, anche se avessero fatto qualcosa di sbagliato;
10. Gli uomini e le donne hanno rispettivamente ruoli differenti da giocare in società;
11. Definirei alcuni atti sbagliati perché sono innaturali;
12. Non potrei mai avere motivo per uccidere un essere umano;

13. Penso che sia moralmente sbagliato che i bambini ricchi ereditino molti soldi, mentre i bambini poveri non ereditino nulla;
14. È più importante saper stare in squadra che lavorare da solo;
15. Se fossi un soldato e non fossi d'accordo con gli ordini del mio comandante, obbedirei comunque perché è mio dovere;
16. La castità è una virtù importante e preziosa;

Per determinare l'esito, le risposte degli utenti vengono organizzate in una griglia fornita dagli autori del questionario. Ogni colonna della tabella corrisponde a un fondamento morale, e il valore di ciascun fondamento è calcolato sommando i valori presenti nella colonna corrispondente. Più alto è il valore, maggiore è l'importanza di quel fondamento nelle decisioni morali dell'individuo.

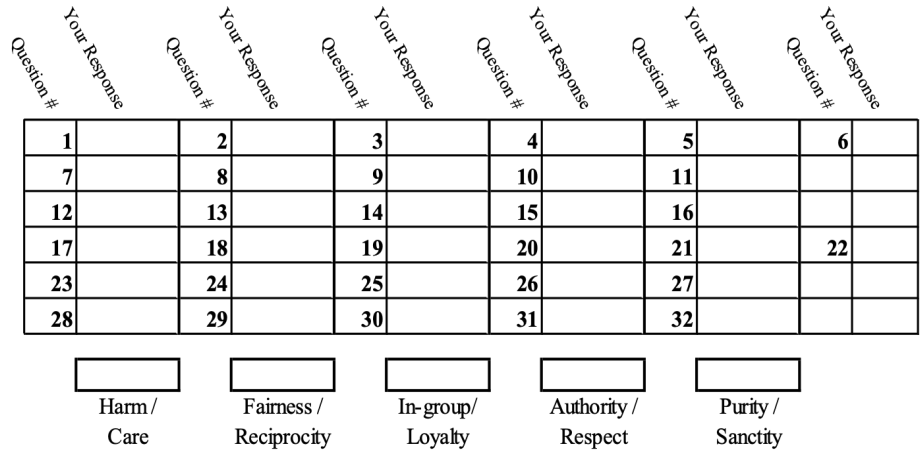

Figura 1 - Tabella dei risultati del MFQ

Per contestualizzare il tema e introdurre gli utenti al questionario (i volontari non erano stati informati sulla sperimentazione, ma era stata chiesta loro solo la disponibilità a rispondere ad alcune domande), è stato rielaborato un testo tratto da un'opera di Bandura ed è stato utilizzato come prologo generale:

> Riflettiamo su un aspetto fondamentale della natura umana: la capacità di giustificare moralmente le azioni che altrimenti sarebbero inaccettabili. Questo processo trasforma azioni dannose in comportamenti che percepiamo come necessari o addirittura nobili. È un meccanismo psicologico che permette di mantenere una visione positiva di sé stessi, anche di fronte a scelte che causano dolore e sofferenza ad altri.
> "Coloro che possono farti credere assurdità possono farti commettere atrocità" con queste parole Voltaire ci ricorda quanto sia facile per le credenze influenzare le nostre azioni. Quando le persone sono convinte che le loro azioni siano giustificate da una causa superiore, possono arrivare a commettere atti che normalmente condannerebbero. La storia ci insegna che molte atrocità sono state commesse in nome di ideologie e credenze che, con il senno di poi, rivelano la loro assurdità. Concludo con un invito alla riflessione: è possibile considerarsi agenti morali se queste azioni causano sofferenza? O è necessario cercare un nuovo modo di definire la moralità, uno che non permetta giustificazioni per l'ingiustificabile?[14]

Implementazione del questionario su robot Nao

La programmazione delle funzioni linguistiche e motorie del robot Nao è stata realizzata tramite il software Choregraphe e l'ambiente Python. Per i nostri scopi era indispensabile che il robot comunicasse in italiano e che fosse in grado di esporre autonomamente, con una gestualità fluida, la riflessione introduttiva di Bandura. In linea con la struttura del questionario, era poi necessario che il robot sapesse porre e ripetere una domanda alla quale l'utente avrebbe potuto rispondere tramite gli input predefiniti corrispondenti ai valori numerici della scala Likert. Ogni risposta dell'utente avrebbe dovuto essere salvata e associata al questionario in corso, in un unico file e in forma anonima.

Attraverso la gestione dei boxes preimpostati di Choregraphe, è stato possibile sia definire la lingua parlata dal robot, sia associare ad un box dialogo introduttivo – che si attivava al saluto dell'utente – delle gestualità positive. I boxes dialogo implementano sul robot la capacità di comunicare il contenuto del box stesso e di associare a questo una serie

[14] A. Bandura, *Moral Disengagement in the Perpetration of Inhumanities*, «Personality and Social Psychology Review», 3/1999, pp. 193-209.

di funzioni accessorie. Dai saluti iniziali è stato impostato il passaggio a tre blocchi dialogici successivi: il primo contenente le istruzioni generali per l'interazione col Nao, il secondo la riflessione tratta da Bandura, e il terzo l'introduzione alla prima sezione del questionario.

Per ogni domanda del MFQ è stato creato un box generale con al suo interno una serie di blocchi con funzioni differenti. Alla funzione "choice", che implementa la domanda a risposta multipla sul robot, è stato associato un box di script Python per il salvataggio delle risposte, in modo che queste venissero scritte in un file .txt creato al momento della prima risposta in una directory definita.

A conclusione della prima parte del questionario, è stato inserito un box dialogo con il testo dell'introduzione alla seconda parte. Al termine dell'intero MFQ, il file con tutte le risposte veniva rinominato con una stringa di caratteri casuali e spostato nella cartella scelta come archivio dei dati, e il robot comunicava i suoi saluti con gestualità positive e rimaneva in attesa del partecipante successivo mediante un riavvio automatico dell'intero programma.

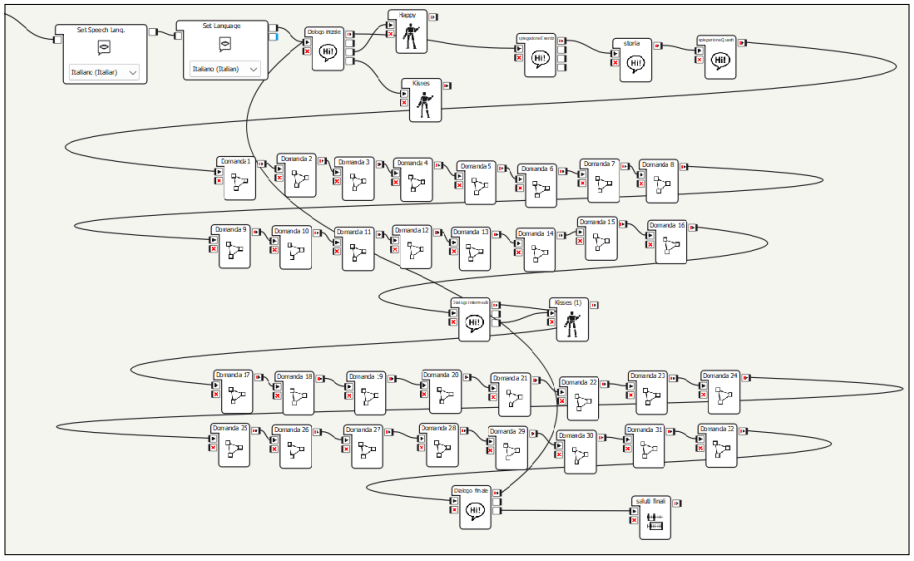

Figura 2 - Programmazione del Nao per la somministrazione del MFQ

Somministrazione del questionario: interazione indiretta

Per la somministrazione del questionario con interazione indiretta è stato raccolto un campione di convenienza composto da 70 individui che hanno partecipato volontariamente senza ricevere compensi. L'età dei partecipanti variava dai 20 ai 70 anni. Il questionario impiegato era anonimo e i dati raccolti sono stati utilizzati esclusivamente a scopo statistico. I partecipanti sono stati assegnati casualmente a due gruppi distinti, ciascuno composto da 35 individui. La distribuzione di genere all'interno del primo gruppo di campione è stata del 43,2% di uomini e del 56,8% di donne; mentre all'interno del secondo gruppo di campione è stata del 36,1% di uomini e del 63,9% di donne. La suddivisione casuale ha garantito un'equità del trattamento tra i gruppi e la riduzione di potenziali bias nei risultati dello studio.

Sono quindi stati registrati due video: uno in cui le riflessioni introduttive di Bandura venivano presentate dal robot, l'altro in cui le stesse riflessioni venivano presentate da una persona. Sono stati creati due moduli Google con le domande del MFQ, introdotti ciascuno da uno dei due video. Questo approccio ha permesso di distribuire i questionari ai due gruppi tramite internet, riducendo al minimo l'interazione col robot e con l'umano.

Figura 3 - Frame del video del Nao

Analisi dei risultati

L'organizzazione dei dati raccolti tramite i due moduli in un unico file Excel, in colonne che rappresentano i cinque fondamenti e il genere dei partecipanti, ha permesso la loro preparazione per le analisi statistiche. È stata aggiunta, alle altre, una colonna contenente il dato sulla tipologia del questionario (introdotto dall'umano o introdotto dal Nao), creando così una variabile indipendente necessaria per condurre una Multivariate Analysis of Variance (MANOVA).

	A	B	C	D	E	F	G
1	Genere	Harm/Care	Fairness/Reciprocity	In-Group/Loyalty	Authority/Respect	Purity/Sanctity	Tipologia Questionario
2	Uomo	20	17	11	11	6	Umano
3	Donna	23	19	19	12	14	Umano
4	Uomo	23	20	14	8	7	Umano
5	Donna	29	28	23	17	20	Umano
6	Donna	28	29	29	21	18	Umano
7	Uomo	29	29	27	19	24	Umano
8	Uomo	25	27	24	19	12	Umano
9	Donna	23	26	20	17	17	Umano
10	Donna	22	26	18	8	5	Umano
11	Uomo	25	22	18	18	18	Umano
12	Donna	26	27	15	8	8	Umano
13	Donna	27	21	22	23	23	Umano
14	Donna	24	27	18	16	22	Umano
15	Donna	22	23	22	17	20	Umano
16	Uomo	23	26	21	10	11	Umano
17	Uomo	27	25	21	14	12	Umano
18	Donna	18	15	15	12	10	Umano
19	Donna	29	30	18	16	16	Umano
20	Uomo	18	20	18	17	11	Umano
21	Donna	26	25	22	20	22	Umano
22	Uomo	27	27	26	19	15	Umano
23	Donna	30	28	15	5	8	Umano
24	Donna	27	30	24	24	17	Umano
25	Uomo	27	21	15	14	8	Umano
26	Uomo	20	25	21	19	18	Umano
27	Donna	30	28	30	21	20	Umano
28	Uomo	24	17	22	23	18	Umano
29	Donna	26	28	21	16	16	Umano
30	Uomo	28	26	24	21	16	Umano
31	Donna	28	29	24	19	23	Umano
32	Uomo	20	23	17	17	14	Umano
33	Uomo	15	19	13	9	5	Umano
34	Donna	25	26	20	15	9	Umano
35	Donna	23	21	12	11	8	Umano
36	Uomo	23	25	16	11	11	Umano

Figura 4 - Dataset manipolato (2)

37	Donna	30	28	22	5	7 Robot
38	Donna	26	25	16	9	12 Robot
39	Uomo	24	23	24	19	10 Robot
40	Uomo	30	30	24	21	21 Robot
41	Uomo	20	30	12	3	5 Robot
42	Donna	29	24	16	14	16 Robot
43	Donna	21	29	14	8	9 Robot
44	Uomo	21	24	16	19	6 Robot
45	Donna	28	27	28	25	21 Robot
46	Donna	23	22	22	19	14 Robot
47	Donna	30	27	18	18	11 Robot
48	Uomo	10	18	12	8	4 Robot
49	Donna	28	25	19	12	6 Robot
50	Uomo	27	23	30	29	27 Robot
51	Donna	21	22	14	13	9 Robot
52	Donna	27	27	21	24	25 Robot
53	Donna	27	29	16	11	5 Robot
54	Donna	23	26	8	11	0 Robot
55	Donna	27	26	26	23	18 Robot
56	Donna	29	28	23	25	16 Robot
57	Uomo	30	30	16	11	6 Robot
58	Donna	29	28	13	12	9 Robot
59	Donna	25	21	14	15	12 Robot
60	Uomo	30	29	21	15	12 Robot

Figura 5 - Dataset manipolato (1)

Dopo aver caricato il dataset così costituito in JASP, è stata realizzata l'analisi multivariata per verificarne la varianza in relazione alla tipologia del questionario, ottenendo come risultato un p value complessivo di 0.463 (e dunque molto maggiore della soglia significativa massima di 0,05).

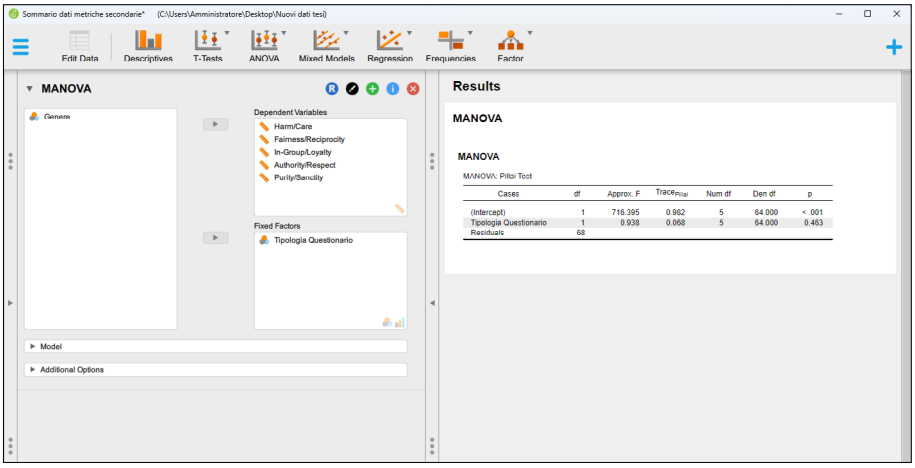

Figura 6 - Analisi multivariata

Valutando il comportamento delle singole variabili dipendenti in relazione alla tipologia del questionario – realizzando dunque un'analisi della varianza semplice (ANOVA) – si ottiene un risultato simile, con una leggera variazione di p value per ogni variabile.

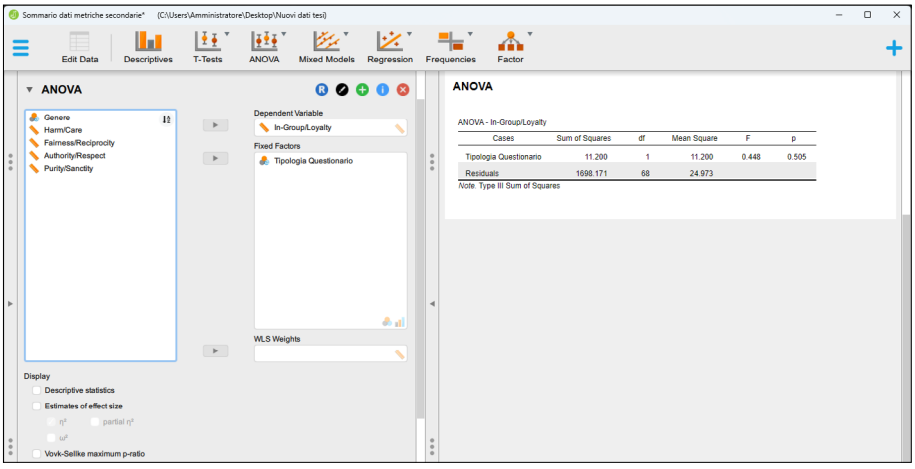

Figura 7 - Esempio di ANOVA

Tuttavia, considerando il genere dei partecipanti come variabile indipendente, emerge un dato statisticamente rilevante in relazione al fondamento *Harm/Care*.

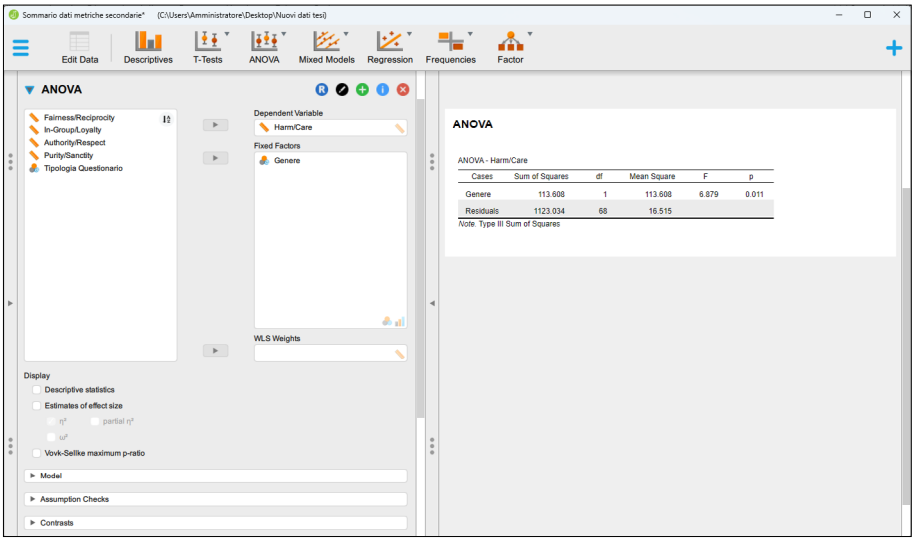

Figura 8 - Dato statisticamente rilevante per il fondamento Harm/Care

Dato che può essere espresso graficamente come segue.

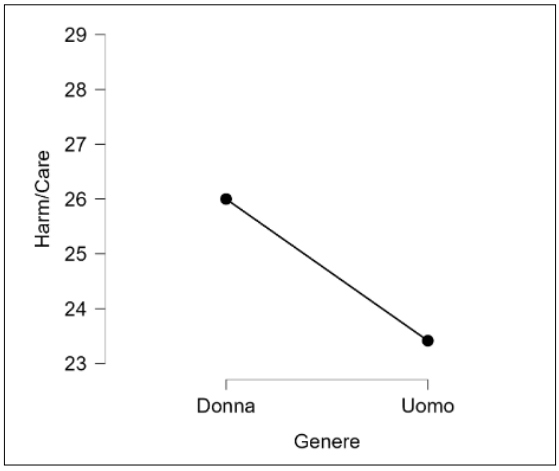

Figura 9 - Rilevanza statistica della differenza di genere per il fondamento Harm/Care

Notiamo che *Harm/Care* non genera differenze significative in relazione alla tipologia del questionario:

ANOVA - Harm/Care ▼

Cases	Sum of Squares	df	Mean Square	F	p
Genere	109.771	1	109.771	6.488	0.013
Tipologia Questionario	3.196	1	3.196	0.189	0.665
Genere ✻ Tipologia Questionario	2.052	1	2.052	0.121	0.729
Residuals	1116.703	66	16.920		

Note. Type III Sum of Squares

Figura 10 - Confronto tra le variabili indipendenti Genere e Tipologia

Discussione dei risultati e progettazione della somministrazione con interazione totale

L'analisi dei dati raccolti dalla somministrazione indiretta del MFQ non ha evidenziato differenze statisticamente significative tra le risposte fornite al robot e quelle fornite all'umano. Tuttavia, è emersa una distinzione di genere nella percezione della cura, con le donne che tendono a ottenere punteggi più alti rispetto agli uomini, confermando quanto già rilevato in uno studio[15] sul genere e l'accuratezza degli stereotipi consensuali nei fondamenti morali. Sebbene questo dato di genere abbia un certo valore nella riflessione generale della Teoria dei fondamenti morali, la sperimentazione sull'interazione indiretta non ha prodotto risultati positivi.

L'interazione totale, non ancora realizzata nonostante l'implementazione del MFQ sul Nao, è stata ideata tenendo conto di alcune condizioni. Il campione di volontari dovrebbe essere diverso rispetto a quello scelto per l'interazione indiretta. La somministrazione del questionario da parte del Nao e da parte dell'umano dovrebbe avvenire in luoghi diversi, per evitare condizionamenti reciproci dei gruppi. Lo scopo della sperimentazione non dovrebbe essere spiegato ai partecipanti, così da non condizionare l'agire spontaneo del campione con

[15] F. Niazi, A. Inam, Z. Akhtar, *Accuracy of consensual stereotypes in moral foundations: A gender analysis*, «Plos One», 5/2020, https://doi.org/10.1371/journal.pone.0229926.

obbiettivi teorici. In generale, potrebbero essere pensati sia livelli intermedi di interazione, sia la comparazione incrociata dei dati delle diverse fasi della sperimentazione.

Conclusioni e prospettive future

La sperimentazione qui proposta ha risposto parzialmente alla domanda di ricerca sugli effetti dell'interazione uomo-robot nell'autenticità dei valori morali sottesi ai giudizi etici. Essa si muoveva lungo due direttrici, quella uomo-robot e quella maggiore-minore interazione. È stato constatato come l'interazione con i robot nella dimensione della minor interazione possibile non produca differenze apprezzabili sulla espressione dei valori morali dei partecipanti. Quali sarebbero i risultati in un contesto di interazione totale?

A prescindere dalla specificità del caso qui riportato, che si serve degli strumenti della Teoria dei fondamenti morali e del Moral foundation questionnaire, si è voluto proporre in questa sede un approccio metodologico che prevede l'utilizzo dei robot e dell'intelligenza artificiale come strumenti per indagare le capacità e le dinamiche cognitive, psicologiche e sociali dell'essere umano. Questo modello sperimentale offre agli studiosi l'opportunità di approfondire temi classici delle scienze umane utilizzando le nuove tecnologie.

Dall'esplorazione delle dinamiche di interazione uomo-robot, emergono una serie di domande fondamentali, la cui risposta necessiterebbe sperimentazioni mirate. Se l'atteggiamento degli umani nei confronti del Nao dovesse mostrare aspetti significativi, quali sarebbero le dinamiche relazionali tra uomini e robot in contesti quotidiani? Possono i robot essere considerati, a loro volta, agenti morali partecipando alla creazione di un ambiente sociale?[16] Qual è la relazione tra essere morali ed essere sociali?

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[16] Nel contesto della teoria dei sistemi di Bateson, questo è assolutamente possibile: «Ciò che "pensa" e procede per "tentativi ed errori" è l'uomo *più* il calcolatore *più* l'ambiente. [...] Quello che pensa è il sistema totale, che procede per tentativi ed errori, ed è costituito dall'uomo più l'ambiente» (G. Bateson, *Verso un'ecologia della mente*, Adelphi, Milano 1977, pp. 502-503).

Gogoshin[17] sfida la visione comune che vede i robot come ontologicamente impossibilitati a divenire membri a pieno titolo della comunità morale umana, sostenendo che essi sarebbero addirittura agenti morali ideali. L'approccio comportamentista alla base di questa affermazione si concentra sulle azioni osservabili piuttosto che sulle intenzioni sottostanti. Da questo punto di vista i robot, limitati nell'azione dai loro algoritmi, potrebbero soddisfare i criteri di agency morale meglio di alcuni esseri umani. Questi ultimi vivono nella condizione di fallibilità rispetto ai valori morali a causa di pregiudizi, emozioni o errori di giudizio. I robot, guidati da programmazioni precise, potrebbero agire, al contrario, in modo più coerente con i principi etici stabiliti.

Da qui, gli interrogativi sulle modalità di programmazione affinché i robot possano agire in modo etico e sul collocamento delle responsabilità in caso di azioni dannose. Se la moralità dei robot è definita dalla loro programmazione e dagli algoritmi che seguono, è fondamentale stabilire standard etici chiari in linea con le normative legali esistenti e con quelle in via di sviluppo. Ma chi decide quali sono gli standard etici accettabili? La riflessione morale sui robot include sempre la riflessione sulla morale e sulla dimensione cognitiva degli esseri umani, e sembra essere da questa inseparabile.

[17] D.L. Gogoshin, *Robots as Ideal Moral Agents per the Moral Responsibility System*, in M. Nørskov, J. Seibt, O.S. Quick (a cura di), «Culturally Sustainable Social Robotics», 335/2020, pp. 525-534.

Outlining a Protohistory of Artificial Intelligence and Music: from Antiquity to Nineteenth Century

Ivano Zanzarella

1. Introduction

Today, *Artificial Intelligence* (AI) permeates all fields of human life and experience. Among them, there is also music: Users' music listening experience on devices and platforms is often driven by AI-powered systems, there are software able to compose music autonomously and in almost any musical style, robots have been developed which can conduct symphony orchestras, etc.

In contrast to what one may think, however, *Artificial Intelligence and Music* (AIM), as an implementation of the idea of composing and performing music automatically and without human interventions, has a history that extends far beyond the techno-logical and computer revolution of the recent decades. The automatization of music making processes, in fact, is one of the consequences of applying formal and mathematical thinking to sound, which is something, in hindsight, already happening with Pythagoreans in classical antiquity. Since then, the organization of sounds by means of human-independent mathematical rules and formal procedures has taken various forms, until modern programs and technologies for automatic music composition and performance.

In the present paper, my aim is to lay the basis for a *protohistory* of AIM, i.e. a history of pre-digital and pre-computer systems for automatic music composition and performance, characterized as forms of application of mathematical thinking to music.

Such a historical analysis about AIM, however, requires an important conceptual premise. Today is AI historically and conceptually develops from a rigorous mathematical formalization of the notion of *algorithm*. For this reason, it is not possible to investigate the history of AI

(especially at the first stages of its development) without investigating (at least partly) the history of *algorithms*. To the same extent, outlining a protohistory of AIM largely coincides with outlining the history of algorithmic thinking in music, or, in a word, of *algorithmic music*.

In Section 3, I will go through the main phases of the history of algorithmic music composition and performance from antiquity to the late nineteenth century, which amounts, as stated before, to tracing a protohistory of AIM (systems for automatic composition and performance before the invention of modern digital computers). The historical analysis, however, will be preceded by Section 2, in which I explain more in details the historical and conceptual relation between AI (and therefore AIM) and algorithms. Finally, in Section 4 I briefly recapitulate the results of the previous historical analysis and sketch the coordinates for a history of modern computer-based AIM, which will be object of future work.

2. The Historical and Conceptual Path from Algorithms to Artificial Intelligence

Artificial Intelligence (AI) has a long history, which traces back at least to ancient Greeks. However, disregarding its early ancestors[1], one of the official starting point in the recent history of Artificial Intelligence is acknowledged to be Alan Turing's work on the *Entscheidungsproblem* in the mid-1930s[2].

The *Entscheidungsproblem* (German for "decision problem") had been firstly posed by the German mathematician David Hilbert[3].

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[1] One could consider, for example, systems for formalizing thinking processes such as e.g. Aristotle's syllogistic logic, Lullus' *Ars magna*, Leibniz' *Characteristica universalis*, Boole's binary algebra, etc., as well as early automata and calculating machines such as the *Pascaline*, Leibniz' *Staffelwalze*, Babbage's *Analytical Engine*, etc.

[2] M. Wooldridge, *Brief History Of Artificial Intelligence: What It Is, Where We Are, and Where We Are Going*, Flatiron Books, New York 2022.

[3] D. Hilbert, *Mathematische Probleme*, in «Nachrichten von der Koniglichen Gesellschaft der Wissenschaften zu Gottingen», 1900, pp. 253-297; see also P. Bernays, M. Schönfinkel, *Zum Entscheidungsproblem der mathematischen Logik*, in «Mathematische Annalen», 99 (1), 1928, pp. 342-372; D. Hilbert, *Probleme der Grund-*

In one of its traditional formulations, it goes as follows[4]. Consider a first-order formal theory **K** – e.g. Russell and Whitehead's *Principia Mathematica*, Hilbert's *engere Functionenkalkül* (first-order predicate calculus), Peano arithmetic or any other first-order arithmetic, etc. – and a formula written in the language of **K**. The problem asks for an *effective procedure* (in modern terms, an *algorithm*) for establishing (*deciding*) whether a given formula is provable in **K** or not, i.e. whether, given **K** as a premise and as a conclusion, the latter can be derived from the former in a finite number of steps by using the rules of first-order logic. The provability of in **K** implies the consistency of and **K** (and vice versa), as well as, therefore, the inconsistency of (negation of) and **K**. The problem can be thus equivalently formulated in terms of finding a procedure for establishing (*deciding*) whether the system consisting of **K** and is consistent (which would namely imply that is not provable in **K**, whereby **K** is taken to be in itself consistent).

In this regard, the mathematician Kurt Gödel[5] had already proven that systems like **K** (he particularly refers to the *Principia Mathematica*) are *incomplete* in that they contain formulas which are *undecidable*, i.e. formulas which can be *neither* proved *nor* disproved within the system (Gödel's first *incompleteness theorem*). Moreover, if there are formulas such that neither nor are provable in **K**, then it is also impossible to prove the consistency of **K** from within the system itself (Gödel's second *incompleteness theorem*).

Gödel's proof of the incompleteness (and inconsistency) of **K** already suggested that the solution to the *Entscheidungsproblem* could not have been a positive one. He did not attempt to solve the problem himself. However, his results built the fundamental theoretical background against which, not much later, a solution to the *Entscheidungsproblem* could eventually be found with a rigorous proof of the

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legung der Mathematik, in «Mathematische Annalen», 102 (1), 1930, pp. 1-9; D. Hilbert, W. Ackermann, *Grundzüge der theoretischen Logik*, Springer, Berlin 1928.

[4] See also A.M. Turing, *On computable Numbers, with an Application to the Entscheidungsproblem*, in «Journal of Mathematics», 58, 1936, pp. 345-363, p. 259ff.

[5] K. Gödel, *Über formal unentscheidbare Sätze der Principia Mathematica und verwandter Systeme*, in «Monatshefte für Mathematik und Physik», 38, 1931, pp. 173-198; see also K. Gödel, *Zum Entscheidungsproblem des logischen Funktionenkalküls*, in «Monatshefte für Mathematik und Physik», 40 (1), 1933, pp. 433-443.

non-existence of an effective procedure for deciding the provability of in **K**. And this is exactly an accomplishment that was reached simultaneously, but independently, by Alonzo Church (1903-1995) and Alan Turing (1912-1954) during the mid-1930s.

Both Church and Turing started with an essential step: giving a rigorous definition of the notion of *effective procedure*, i.e. of *algorithm*, in general and formal terms. Previously, the concept of algorithm had no formal definition and were just intuitively understood as a way of solving (mostly mathematical) problems by starting from given inputs and strictly following a finite sequence of instructions[6]. In particular, Church[7] attempted to give such definition by developing the so-called λ-calculus, which was originally aimed at providing a consistent logical foundation of mathematics – its first version was however proved to be inconsistent. At the core of Church's λ-calculus is the precise definition of *computable function*, i.e. a function that can be calculated by an algorithm. In this formal system, computing a function (finding the output value given an input value) corresponds to manipulating λ-expressions. One of the first achievements of the λ-calculus was to show that no positive answer namely exists to the *Entscheidungsproblem*: given two λ-expressions as an input, no computable function exists which can decide whether they are equivalent or not.

Just a couple of months later after Church published his paper, Turing[8] came up with his own solution to the *Entscheidungsproblem*. The first step was also giving a precise definition of *algorithm*. In Turing's case, this happened by introducing the concept of *computing machine*, an abstract theoretical model conceived for investigating the class of (mathematical) problems that can be solved by computation. A *Turing machine*[9] (TM) consists of a tape and a "head" which moves along it. The tape is divided into discrete cells *r* and is one-way infinite – mean-

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[6] J.-L. Chabert et al., *A History of Algorithms: From the Pebble to the Microchip*, Springer, Berlin 1999, pp. 455ff; see also Section 1.1.

[7] A. Church, *An Unsolvable Problem of Elementary Number Theory*, in «American Journal of Mathematics», 58 (2), 1936, pp. 345-363; see also A. Church, *A Note on the Entscheidungsproblem*, in «The Journal of Symbolic Logic», 1 (1), 1936, pp. 40-41.

[8] See A.M. Turing, cit., p. 5.

[9] The term "Turing machine" for indicating Turing's computing machine was coined by Church (who was Turing's doctoral advisor) in 1936.

ing, there is always a "first" cell from which the computation begins[10]. Each cell carries exactly one symbol S_1, ..., S_m (with $S_1 = 0$, $S_2 = 1$ and S_0 for a blank cell), drawn from a finite set of symbols the machine's alphabet. At each step of the computation, the head is positioned over exactly one cell and has the ability to read the symbol on it. Depending on the symbol read, the head can undertake different types of actions: write a new symbol in the cell, move to the next cell on the right or on the left, remain on the same cell. The actions of the head, however, also depend on the current state the machine is in: at each step of the computation, in fact, the machine is in a state q_1, ..., q_n from a finite set of states Q (with $s \in Q$ being the initial state). Thus, the program of a Turing machine takes the form of a finite series of quintuples

$$q_i S_j S_{i,j} M_{i,j} Q_{i,j}$$

whereby q_i is the current state of the machine, S_j the symbol to be read, $S_{i,j}$ the new symbol to be written, $M_{i,j}$ the next position of the head (one cell to the left, to the right, or no movement), $q_{i,j}$ the next state of the machine.

Given an input, the machine will go through a finite number of different state transitions and eventually halt giving the adequate output. This is how a TM can solve, for example, problems such as finding the values of mathematical functions starting from given numerical values as inputs. In general, it is assumed that every computable problem (i.e. every algorithmically solvable problem) can be solved (computed) by a Turing machine (or by any computing system equivalent to it) – this is known as the *Church-Turing hypothesis*, with reference also to the fact that Turing[11] proved his and Church's computing system to be formally equivalent.

In his famous paper, however, Turing posed another interesting question: is there a way to find out whether problems exist which cannot be solved by computation, viz. by a TM? In other words: Are there prob-

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[10] Potentially, the tape may also be finite depending on the kind of computation performed by the machine.

[11] A.M. Turing (1937), *Computability and «λ-Definability*, in «The Journal of Symbolic Logic», 2 (4), 1937, pp. 153-163.

lems that, if submitted for computing to a TM will cause this latter to never halt and run instead forever? The answer to this question, called *halting problem*, originated from a brilliant intuition: treating this question itself as a computational problem to be computed by a TM. A TM programmed to answer questions about other TMs is called *universal Turing machine* (UTM). Yet, Turing noticed that the existence of a UTM capable of solving the *halting problem* would be contradictory: it is namely *undecidable* whether the TM will halt or not, and there is no algorithm which can decide whether in general a problem is computable.

In declaring the *halting problem* undecidable, Turing proposed his own (negative) answer to the *Entscheidungsproblem*. The mathematics behind this answer and the theoretical model of a general-purpose problem-solving machine (the UTM) inspired later also the construction of some of the first computers in history. Particularly relevant in this respect is, for example, the *Small-Scale Experimental Machine* (also known as *Manchester baby*), developed by Fred Williams and Tom Kilburn at Manchester University around 1948, when Turing himself joined the project and the computer run its first program. The *Manchester baby* was the first all-purpose electronic stored-program computer, meaning, it could be programmed for performing different computational tasks, whereby the programs (algorithms) could be stored in a suitable memory. In this, the *Manchester baby* realized in practice Turing's UTM model[12].

From that point onwards, computers started to become more and more powerful, capable of solving problems and performing tasks of increasing complexity – including those related to the automatic composition and performance of music. Several of this problems and tasks (mathematical calculations, chess playing, etc.) were before appanage of *human intelligence* only. Thus, questions immediately arose: can machines think? Are they "intelligent" like humans are?[13]. Scientists and philosophers started to find an answer to these questions and to investigate the power and limits of *Artificial Intelligence* (AI), which

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[12] See also B. Copeland, *The Manchester Computer: A Revised History, Part 1: The Baby Computer*, in «IEEE Annals of the History of Computing», 33 (1), 2010, pp. 4-21; B. Copeland, *The Manchester Computer: A Revised History, Part 2: The Baby Computer*, in «IEEE Annals of the History of Computing», 33 (1), 2010, pp. 22-37.

[13] See e.g. A.M. Turing, *Computing Machinery and Intelligence*, in «Mind», 59 (236), 1950, pp. 433-460.

was offcially born as a scientific research program at the Dartmouth workshop in 1956, organized by John McCarthy, Marvin Minsky, Nathaniel Rochester and Claude Shannon[14].

3. History of Algorithms in Music

As seen in Section 2, AI has his roots in a mathematical question and in the rigorous formalization of the notion of algorithm. Algorithms are (still today) the backbone of AI systems: these latter run programs, which are nothing but complex lists of instructions for performing tasks and solving problems of various kind and different nature. As a consequence, also AIM systems are based on algorithms. Thus, investigating the history, and the protohistory, of AIM primarily amounts to investigating the history of the use of algorithms for musical purposes or, in a word, the history of *algorithmic music*.

In Section 3.1, I give some etymological remarks about the notion of "algorithm" and some historical details on the use of algorithms in early pure, applied and recreative mathematics. In Section 3.2, I introduce algorithmic music composition and performance as a special case of the recreational use of algorithms, and then move on to expose the protohistory of AIM throughout antiquity and Middle Ages Section 3.2.1, Early modern Section 3.2.2 and eighteenth and nineteenth century Section 3.2.3.

3.1 Algorithms: From Mathematical to Recreational Uses

The term "*algorithm*" has an interesting etymological history. Traditionally, it is traced back to the *nisba* (last part of Arabic names) of an eminent Persian mathematician from the 8-9th century, Muḥammad ībn Mūsā al-Khwarizmī, and to its latinized version *Algorismus*[15]. With his book *Kitab al-hisab al-hindi* (En. *Book of Hindu Numericals*, written around 825 and later translated into Latin with the titles

[14] J. McCarthy et al., *A Proposal for the Dartmouth Summer Research Project on Artificial Intelligence, August 31, 1955*, in «AI magazine», 27 (4), 2006, p. 12.

[15] See also J.N. Crossley, A.S. Henry, *Thus spake al-khwarizmī: A Translation of the Text of Cambridge University Library MS. II. VI. 5*, in «Historia Mathematica», 17 (2), 1990, pp. 103-131; B. Mehri, *From Al-Khwarizmī to Algorithm*, in «Olympiads in Informatics», 11 (Special Issue), 2017, pp. 71-74.

of *Dixit Algorizmi* and *Algoritmi de numero Indorum*), al-Khwarizmī contributed to spreading the Hindu-Arabic positional (or decimal) numeral system in the Middle East and later, from there, in Europe. In this work, he also introduced novel and efficient rules for executing by such a notation the four basic operations, as well as computations with fractions. In another treatise about algebra, *Kitab fi al-Jabr wa al-Muqabala* (En. *Book of Algebra and al-Muqabala*, written around 830), he developed new techniques for solving first – and second-degree equations. In the Late Middle Ages, several Latin translations of this work appeared (e.g. by John of Toledo, Adelard of Bath, Leonardo Pisano, Alexander of Villadieu, John of Halifax, etc.). This made the fame of al-Khwarizmī grow so much across Europe, that, during this time, the word *algorismus* (*algorism*, in English) began to be used for indicating the decimal number system and, more in general, every mathematical procedure involving computations with decimal numbers[16].

In the 18th century, the term "*algorithm*" (probably derived from the combination of *algorismus* and *ἀριθμός*, Greek word for "number") eventually appeared in mathematics – as, for instance, French and German mathematical lexicons from that time confirm[17]. However, it just replaced its medieval antecedent without relevant changes in meaning. In fact, it was not before the late 19th century that this term started to be used as a common name for what we today also generally mean by it: a *procedure* for solving a (computational) problem in a *finite* number of steps by a duly executed *sequence* of precise and elementary *instructions*[18].

The word "*algorithm*" thus acquired the form it possesses today in relatively recent times. Yet, not so recent is the meaning to which this word refers. As sequential procedures for solving individual prob-

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[16] G. Ausiello, *Algorithms, A Historical Perspective*, in G. Ausiello, R. Petreschi (editors), *The Power of Algorithms: Inspiration and Examples in Everyday Life*, Springer, Berlin 2013, pp. 3-26.

[17] See e.g. C. Wol , *Vollständiges Mathematisches Lexicon*, Gleditsch, Leipzig 1747; J.L.R. d'Alembert, D. Diderot (editors), *Encyclopédie ou dictionnaire raisonné des sciences, des arts et des métiers*, A. Le Breton, L. Durand, Paris 1751.

[18] See e.g. R.K. Hill, *What an Algorithm Is*, in «Philosophy & Technology», 29, 2016, pp. 35-59.

lems, in fact, algorithms were used far before the 18-19th century. Algorithmic techniques for numerical computation (square root, resolution of second-degree equations, inverse of a given number, etc.) can be found, for example, already in some Babylonian tablets and Egyptian papyrus from the 2nd millennium BC.

Another famous example of early use of algorithms can be found in classical antiquity, and more precisely in the Book VII (Propositions 1-2) of Euclid's *Elements*: the Euclidean algorithm for calculating the greatest common divisor of two integer numbers[19]. This algorithm[20] consists of a *recursive* procedure in which the greatest common divisor of two numbers a and b is obtained by repeatedly replacing the larger one (say, *a*) by its difference with the smaller one (say, *b*).

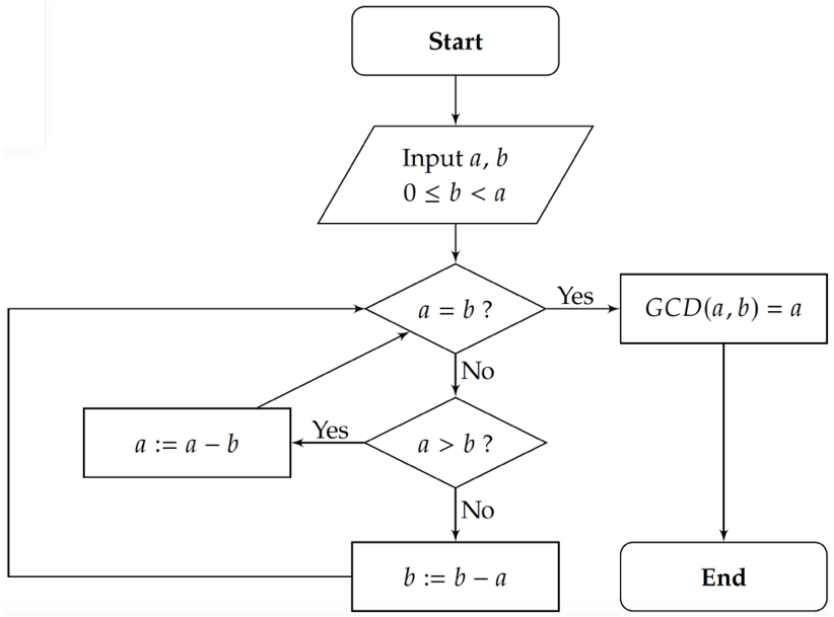

Figure 1. A modern formal flowchart rendition of the Euclidean algorithm for calculating the greatest common divisor (GCD) of two integer numbers *a* and *b*.

[19] Euclid, *Elements*, En. tr. by R. Fitzpatrick, Green Lion Press, Saint Paul (MN) 2022, pp. 445-449.

[20] See Section 1.1.

This *reiterated* reduction eventually leads to finding the number which divides both a and b without remainder, i.e. their greatest common divisor.

The Euclidian algorithm (as the entire mathematics of the *Elements*) originated from the need of solving a theoretical, abstract, mathematical problem and was therefore not directly aimed at practical applications. On the contrary, the algorithmic techniques of Babylonians and Egyptians (as the largest part of their mathematics) were mostly developed for solving practical problems relating to agriculture (e.g. division of fields, warehouses, etc.), commerce, construction of buildings and other human activities pertaining to the productive sphere of society[21]. However, only during the Middle Ages (as far as we know), algorithms began to be used for *recreational* purposes as well, i.e. not only for solving some (abstract or concrete) mathematical problem, but for solving mathematical puzzles. This was for example what the great Italian mathematician Leonardo Pisano, better known with the name Fibonacci, did.

Born to a merchant from the Republic of Pisa, Fibonacci travelled a lot on business across several Mediterranean countries. This gave him the possibility to know and study the works of renowned mathematicians, among others Euclid's *Elementa* and al-Khwarizmī's works about the decimal number system and about the methods for handling with its problems of arithmetic and basic algebra. Indeed, introducing to the Italian people such methods along with the Hindu-Arabic numerals was the principal (and explicitly stated) aim of his masterpiece, the *Liber abaci* (En. *Book of Calculation*), firstly published in 1202. In this book, Fibonacci described in depth concepts and methods of the Arabic *algorism*, presenting them as a more valuable and efficient alternative to the traditional computing techniques of his contemporaries, which were still based on the use of abacus and Roman numerals[22] [23].

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[21] See e.g. G. Ausiello, cit., pp. 4-7.

[22] See also L. Sigler, *Fibonacci's Liber Abaci: A Translation into Modern English of Leonardo Pisano's Book of Calculation*, Springer Science & Business Media, Berlin-New York 2014, p. 4.

[23] For this, Fibonacci is probably to be held most responsible for the diffusion

After a purely theoretical explanation of such concepts and methods, Fibonacci then moved on to treating different practical applications of them, especially in the field of commerce and accounting (e.g. to problems of business negotiation, money exchange, computation of interest, amortization of debts, etc.). Moreover, in Chapter 12 and 13, he applied them for solving in a novel way some traditional mathematical problems belonging to what we would today define as "recreational mathematics", i.e. problems from strictly speaking neither pure nor applied mathematics. The most famous problem of this kind, and also the one for which Fibonacci eventually obtained a place in the history of algorithms (and mathematics), is the problem of the rabbits: "Quot paria coniculorum in uno anno ex uno pario germinentur" (how many pairs of rabbits are generated by one pair in one year). The statement of the problem in Fibonacci's text goes as follows:

> «A certain man had one pair of rabbits together in a certain enclosed place, and one wishes to know how many are created from the pair in one year when it is the nature of them in a single month to bear another pair, and in the second month those born to bear also»[24];

and so, the summary of the steps followed for coming to the answer (a total of 377 rabbits generated in one year starting with one pair):

> «[... W]e added the first number [i.e. the initial number of rabbit pairs] to the second, namely the 1 to the 2, and the second to the third, and the third to the fourth, and the fourth to the fifth, and thus one after another until we added the tenth to the eleventh, namely the 144 to the 233, and we had the above-written sum of rabbits, namely 377, and thus you can in order find it for an unending number of months»[25].

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of the decimal number system in Europe. Another merit which has to be acknowledged to him is to have been one of the first scholars trying to integrate Euclidean and Arabic mathematics, which were so far two relatively disentangled fields. For example, proofs of algorism-based methods were given by him mostly by using conceptual and theoretical categories from the geometric algebra of Euclid's *Elements* – ivi, p. 5.

[24] Ivi, p. 404.

[25] Ivi, p. 405.

Now, from this description, it can be noticed that Fibonacci's solution to the rabbits problem has a form which resembles that of a recursive algorithm[26]. Each term of the sequence (corresponding to the number of rabbits pairs in each month, i.e. 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, ..., 377, ...) is given by the sum of the preceding two terms. In other words, if we call the nth term of the sequence $F(n)$, then $F(n) = F(n–1)+F(n–2)$ – it is generally assumed that for $n = 0$ and $n = 1$, $F(0) = F(1) = 1$. Thus, for instance, for $n = 6$ (6th term of the sequence), we have $F(6) = F(6 – 1) + F(6 – 2) = F(5) + F(4) = 5 + 3 = 8$.

Many other historical examples of algorithmic procedures used for recreational purposes and mathematical games can be found throughout the late Middle Ages and the whole modern era. For instance, various kinds of algorithms were developed for constructing magic squares or for designing and solving labyrinths. Some later applications of algorithms in recreational mathematics even led to important developments in pure mathematics, such as graph[27].

3.2 Algorithms in Music

Among the first uses of algorithms for recreational purposes there has been one related the production of music. Algorithms and other formal procedures from mathematics and geometry have been applied to sounds for organizing, structure and transform them into music without direct and active human intervention. Applying such procedures to sounds for disentangling music from human composers and performers was not only an interesting game to play for its own sake in order to explore the theoretical and creative possibilities of both mathematics and music, but sometimes also a useful practice to employ for compensating the unavailability of composers and performers in some special social contexts[28].

Let us see now in the following how, from antiquity to the nineteenth century, algorithmic thinking has been employed in music for allowing automatic music composition and performance.

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[26] G. Ausiello, cit., pp. 15-16.
[27] Ivi, pp. 17-21.
[28] See Section 3.2.2 and Section 3.2.3.

3.2.1 Antiquity and Middle Ages

The application of formal rules and automatic procedures to music and sound has a long history, which can be traced back at least to the ancient Greece[29]. Traditionally, Pythagoreans are believed to have discovered the mathematical foundations of music theory[30]. They used to study the musical consonances by means of a particular musical instrument – the *κανών* or *monochord*, consisting of a string and a moveable bridge "cutting" it at many possible different points. By properly moving the bridge on the monochord and accordingly setting the length of the string, they noticed that pure consonances only derive from the combination of sounds which are in a specific proportion between each other, a proportion involving only natural numbers. Thus, for obtaining the unison, one has to pluck two strings of exactly the same length (1/1); for the octave, one string must be exactly half as long as the other (1/2); for the fourth, 3/4; for the fifth, 2/3. Arguably from these musical considerations, they conceived of an entire philosophical system which took (natural) numbers as the ultimate principle of reality.

Pythagoreans opened the way to the application of mathematics to music and sound. With this, they introduced a "formal" style of musical thinking which turned out later to be fundamental for the systematization of the Greek musical system based on intervals and modes, relevant in turn for the next developments of Western music theory in general[31]. Since Greek music was mostly improvised, it is still impossible to speak of algorithmic music in a pure sense at this time. The processes of music composition and performance were, in fact, still strictly dependent on active and deliberate human decisions. Yet, the acknowledgment of the role played in music theory by external and human-independent rules of mathematical and formal nature un-

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[29] See e.g. C. Roads (1985), *Research In Music and Artificial Intelligence*, in «ACM Computing Surveys (CSUR)», 17 (2), 1985, pp. 163-190; N. Collins, *Origins of Algorithmic Thinking in Music*, in A. McLean, R.T. Dean (editors), *The Oxford Handbook of Algorithmic Music*, Oxford University Press, Oxford 2018.

[30] C. Riedweg, *Pythagoras: His Life, Teaching, and Influence*, Cornell University Press, Ithaca 2008.

[31] See e.g. D.J. Grout, C.V. Palisca, *A History of Western Music*, Norton, New York 2001.

doubtably appears to be something important in the history of algorithmic music (and of AIM, accordingly).

In the wake of Pythagoreans philosophy, the interconnections between music and mathematics became even stronger during the Middle Ages. In medieval universities, for example, students had to complete a special study program before joining one of the higher faculties (theology, law, and medicine) and obtain the title of "Doctor". This program involved the seven *artes liberales*, which were divided into *trivium* and *quadrivium*. Whereas the *trivium* consisted of humanistic disciplines (grammar, logic, and rhetoric), the *quadrivium* was aimed at providing students with advanced mathematical knowledge. Beyond arithmetic, geometry and astronomy, music was also a part of this program. In fact, music was not only an art, in the modern sense of the term, but also a science of mathematical nature focused on the study of proportions[32].

And it was during the Middle Ages that a further step forward towards the development of a working system of algorithmic music performance and composition was taken. This was possible thanks to an important development in music theory, namely the introduction of neumatic and, later, diastematic notation during the 9th and 10th century. Allegedly inspired by the mathematics of that time, in which the first attempts to discretize space and Aristotelian qualities were taking place[33], such new musical notations allowed for a first *discretization* of sound with respect to two musical dimensions: time and pitch. Neumes were the simplest and discrete units identifying the (finite) duration of a sound, and diastemacy enabled a first, albeit raw, identification of tones, i.e. of sounds having a fixed, discrete, pitch[34]. With the introduction of neumes and diastemacy, thus, musical sounds even acquired a characterization of *formal entities* that, like the points, lines and surfaces of geometry, could be organized and transformed by means of formal rules.

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[32] See e.g. I. Caiazzo, C. Macris, A. Robert, *Brill's Companion to the Reception of Pythagoras and Pythagoreanism in the Middle Ages and the Renaissance*, Brill, Leiden 2021.

[33] L. Borzacchini, *Incommensurability, Music and Continuum: A Cognitive Approach*, in «Archive for History of Exact Sciences», 61 (5), 2007, pp. 273-302.

[34] J. Grier, *Musical Notation in the West*, Cambridge University Press, Cambridge 2021.

An attempt in this direction was made by Guido d'Arezzo (991-1033 ca.). Known above all for the invention of tetragram and square notation – with which the discretization of musical sound could become even more precise – d'Arezzo can be considered the true initiator of algorithmic music[35]. In his most important work, *Micrologus*[36], in fact, he devised a system for *automatically* generating melodies out of texts. This system relies on a correspondence between vowels and pitches on the basis of which the "translation" of entire sentences into music melodies is possible (see Figure 2 for an example).

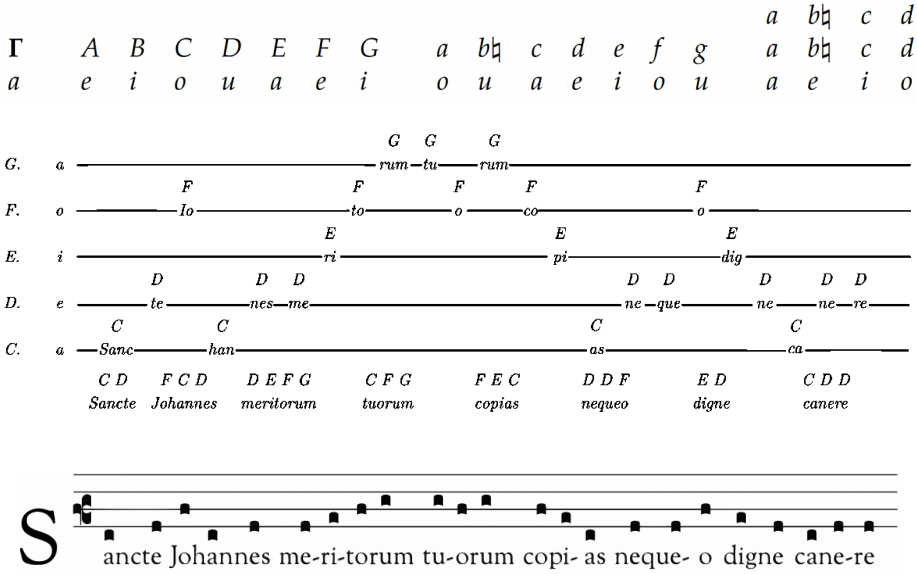


Figure 2. Guido d'Arezzo's system of correspondence between vowels and notes[37] (above); application of the system to a sentence in Latin[38] (middle); transcription of the result on the tetragram (below).

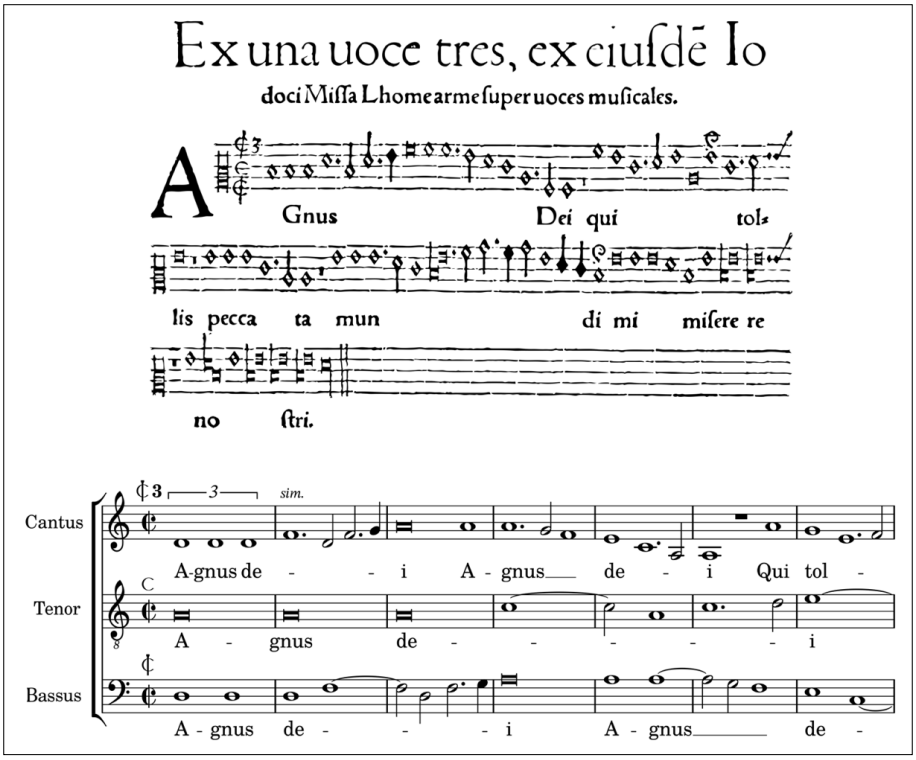
[35] R.T. Dean (editor), *The Oxford Handbook of Algorithmic Music*, Oxford University Press, Oxford 2018.

[36] G. d'Arezzo, *Le opere: Micrologus, Regulae rhythmicae, Prologus in Antiphonarium, Epistola ad archiepiscopum Mediolanensem*, Sismel Edizioni del Galluzzo, Florence 2005.

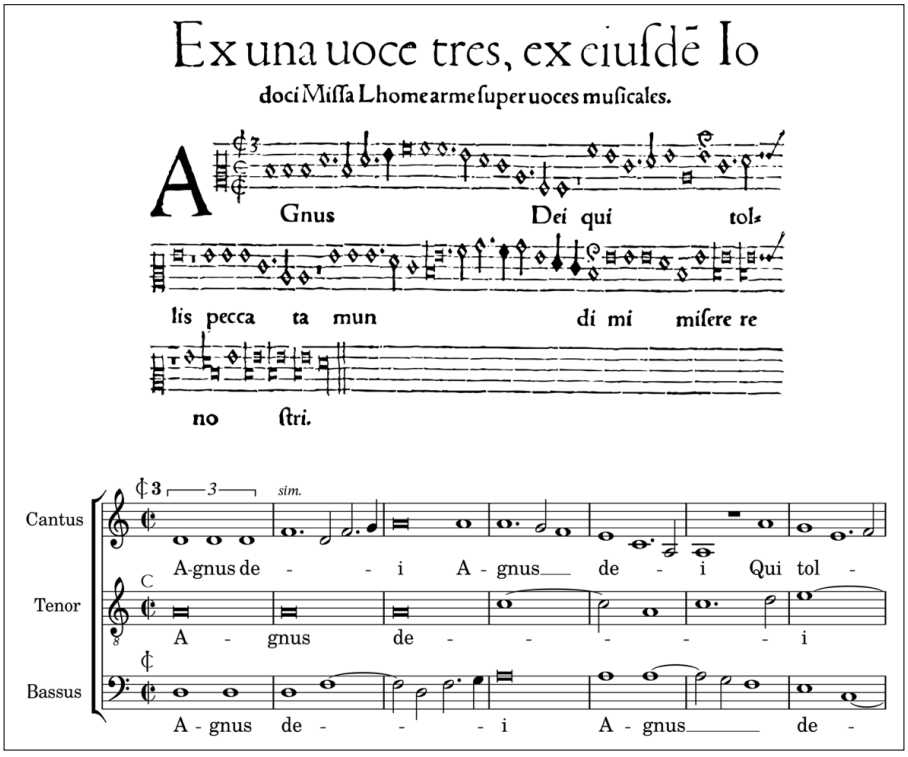
[37] G. d'Arezzo, *Micrologus*, A.M. Amelli (editor), L. Desclee, & C. Editori Pontifici, Rome 1904, p. 40.

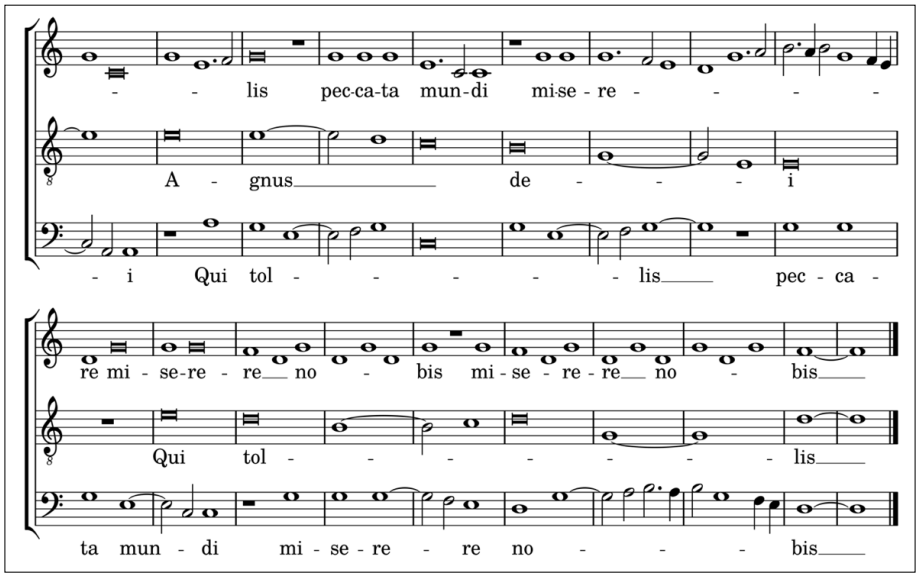
[38] Ivi, p. 41.

After Guido d'Arezzo, another musical invention was particularly relevant to the development of algorithmic music and AIM: the canon, a musical form which added to music composition and performance layers of abstraction that were indeed absent before. From the Latin *canon* (norm, rule), the canon firstly appeared as a musical form during the 13th century. It consists of a melody played or sung by a voice (*dux*) which is variously imitated by other voices (*comites*) after a given delay and at a given pitch distance. In order to compose a canon, in fact, the composer just needs to write down a suitable melody, and to specify the *rules* according to which the other voices have to be constructed[39] .These rules can be also formally expressed, as it happens for example in the *Agnus Dei* (see Figure 3) from the *Missa L'homme armé super voces musicales* (15th century) by Josquin des Prez (1450ca.-1521).



[39] See e.g. D.J. Grout, C.V. Palisca, cit.


Ex una uoce tres, ex ciuſdē Io
doci Miſſa Lhome arme ſuper uoces muſicales.
Gnus Dei qui tol-
lis pecca ta mun di mi miſere re
no ſtri.
Cantus
Tenor
Bassus
A-gnus de - - i A - gnus de - i Qui tol -
A - gnus de - - - - - i
A - gnus de - - - i A - gnus de -


- - lis pec-ca-ta mun-di mi-se - re - - - -
A - gnus de - - - i
- i Qui tol - - - - - lis pec - ca -
re mi - se-re - re no - bis mi - se - re - re no - bis
Qui tol - - - - - - - lis
ta mun - di mi - se - re - re no - - - bis

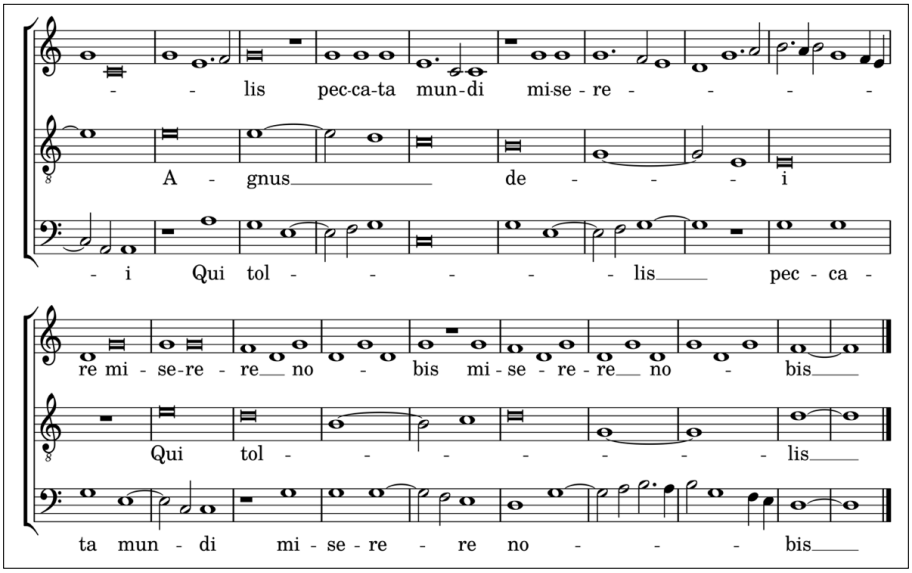


Figure 3. *Agnus Dei* from the *Missa L'homme armé super voces musicales* (15th century) by Josquin des Prez (1450ca.-1521): score in early mensural notation[40] (above); realization of the canon in modern notation (below).

The score only contains the principal voice (*cantus firmus*). From the title ("*Ex una voce tres*"), we already know that the canon has three voices (*dux* included). This is however also specified by the symbols occurring in the key signature: there are, in fact, three time indications (𝅗𝅥3, C and 𝅗𝅥), which gives us a clue on the number of voices. Those symbols, however, deliver information also about the way each *comes* should be constructed, in particular with respect to timing. The canon in question is in fact a mensural one, meaning that the other voices imitate the *cantus* at different speeds: The tenor triples the values of all its notes, whereas the bass doubles them.

As for the pitch, notice that Desprez uses the particular symbol 𝄐 for indicating the ending note of each *comes*, if correctly constructed. From this, among other things, the pitch of each *comes* can be deduced: the bass imitates the *cantus* with the same pitches an octave below, whereas the tenor with those pitches but transposed a fourth

[40] From H. Glareanus, *Dodecachordon*, Henrichum Petri, Basilea, p. 442.

down – in fact, should otherwise the tenor imitate the *cantus* with the same pitches as the bass, it would end with a *g3*, which makes no sense if one considers the final *D* minor harmony created by the other two voices.

As this example clearly shows, in the canon the composition process is not entirely human-dependent. In fact, in this musical form, part of the music is "automatically" produced by applying formal rules which are defined in advance by the composer and (like the steps of an algorithm) act as a mediator between them and the final result of the composition process. During the 15th-17th century, the canonic technique underwent considerable advancements in that new (creative) rules were introduced which indeed contributed to enlarge the distance between the composer and the final composition.

3.2.2 Early Modern

Although the invention of the canon introduced elements of abstraction and automatization essential to the development of algorithmic music and AIM, composers probably never thought of, and deliberately used, it as a means to exclude their presence and decisions from the process of music composition (and performance). In other words, they never considered the canon as a form of "artificial" music – nor could that be such, as we have seen, since the basis of all canons (the *cantus firmus*) always requires the active intervention of the composer in order to be produced.

During the 17th century, however, a German Jesuit, the polymath Athanasius Kircher (1602-1680), proposed the first truly algorithmic system *intentionally* aimed at generating music artificially: the *Musarithmica mirifica*[41].

At the core of Kircher's *Musarithmica mirifica* is the application of combinatorics for composing music. As a mathematical research field, combinatorics had a quite long history at the time of Kircher, tracing back at least to ancient Egyptians[42]. Scholars such as Ramon Llull

[41] A. Kircher, *Musurgia universalis sive ars magna consoni et dissoni*, Volume 2, Francesco Corbelletti, Rome 1650, Liber VIII.

[42] See e.g. N.L. Biggs, K.E. Lloyd, R.J. Wilson, *The History of Combinatorics*, in R.L. Graham, M. Grötschel, L. Lovász (editors), *Handbook of Combinatorics*, Volume 2, MIT Press, Cambridge (MA) 1995, pp. 823-879.

(1232-1316ca.) already attempted to apply its rules to perform reasonings in logic, philosophy and theology (see e.g. his method of *Ars magna*). Yet, following the influential studies by Llull and others, Kircher was allegedly the first to apply combinatorics to music composition.

The *Liber VIII* of the *Musurgia universalis* opens with some mathematical considerations about general combinatorics and permutation theory which are then applied to music – permutation of chords, notes, intervals, durations, etc. (*Musurgia combinatoria*). Afterwards, some notes on prosody and poetic rhythm are given – meters, accents, syllabication, correspondence between poetic meters and musical durations, etc. (*Musurgia rhythmica sive poetica*). After these introductory parts, Kircher moves on, in the *Musurgia mirifica*, to an accurate description of his system of automatic music composition.

Firstly, a text has to be chosen (Kircher's system is conceived for composing mostly vocal music). Let us take the traditional Christian hymn *Veni Creator Spiritus*, used by Kircher himself as an example:

Veni Creator Spiritus,
Mentes tuorum visita,
Imple superna gratia,
Quae tu creasti pectora.
[...]

Then, each must be divided in syllables:

Ve-ni Cre-a-tor Spi-ri-tus,
Men-tes tu-o-rum vi-si-ta,
Imp-le su-per-na gra-ti-a,
Quae tu cre-as-ti pec-to-ra.
[...]

Notice that the *Musarithmica mirifica* allows to compose (polyphonic) music basically according to two different styles, called *syntagmata* by Kircher: the *contrapunctus simplex* (whereby all voices are homorythmic) and the *contrapunctus floridus* (whereby the voices are heterorythmic). The next step is thus choosing one of these styles according to the complexity one wishes to give to the piece – let us take the first

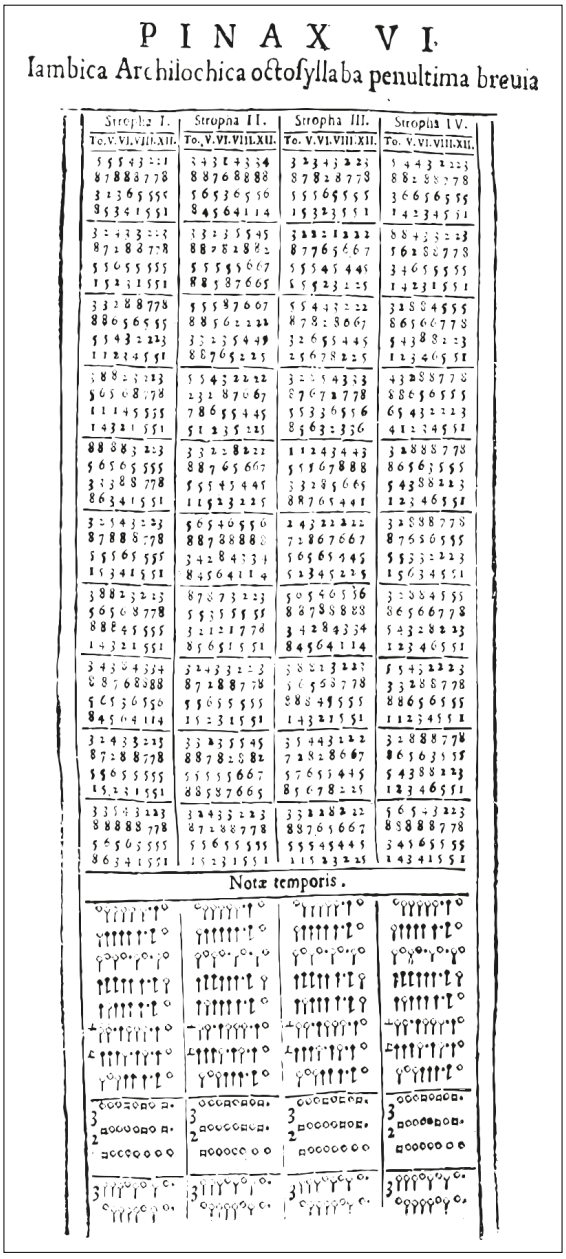


Figure 4. Example of a *pinax*[43]. In this case, *Pinax VI* suits iambic archilochean octosyllables with short second-last syllable (indeed the metric of the *Veni Creator*).

[43] From A. Kircher, cit., p. 83.

for our example. After that, a so-called *pinax* (Latin for "table") has to be picked out from within the *syntagma*. The *pinax*, or *tabella melotactica* (see Figure 4), is a table containing a collection of many different *combinations* of characteristic 4-voices chords notated with the typical numbers of figured bass. A specific *pinax* can be chosen so far it is coherent with the meter of the text, i.e. with the number of syllables in each verse – in our case (iambic archilochean octosyllables with short second-last syllable), *Pinax VI*.

In a square (*musarithmus*, in Kircher's terminology), corresponding to a single verse, there are four rows for the four voices of the composition, with numbers representing the melody sung by each of them – each number identifies the position of the note in a *modus*. Vertically, each 4-number column corresponds (in *contrapunctus simplex*) to exactly one syllable of the verse, and reports the general harmony of the piece in that point.

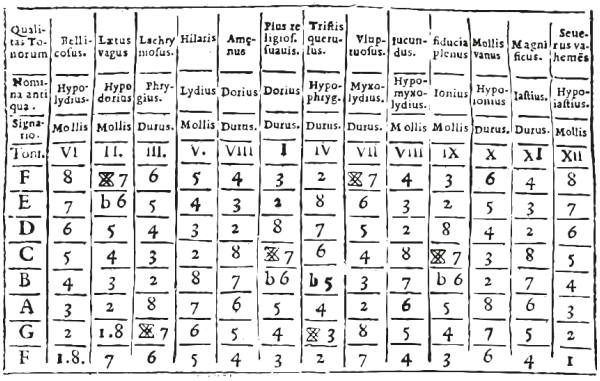
For the other verses, one may theoretically choose any of the *musarithmi* on the *pinax*. In general, the variety of the *pinaces*, which in turn guarantees the variety of the musical results generated through them, is achieved thanks to combinatorics: *Pinaces* are in fact build by permutations and combinatorial rearrangements of numbers, columns, rows and squares. This makes the creative capabilities of the systems particularly large, so that millions of possible different musical pieces can be composed.

Once the correspondence between verses and *musarithmi* is set, however, one still does not have information about the duration of the notes in the composition. For this, it is possible to refer to the *Notae temporis* at the bottom of the *pinax*: Schemes for durations (again, combinatorially generated) can be arbitrarily chosen and associated to a *musarithmus*. So, in our example, we come up for the first verse of the first strophe with a result of the following kind:

5	5	5	4	3	2	2	1
8	7	8	8	8	7	7	8
3	2	3	6	5	5	5	5
8	5	3	4	1	5	5	1
Ve-	*ni*	*Cre-*	*a-*	*tor*	*Spi-*	*ri-*	*tus*

After that, the *modus* of the composition has finally to be chosen, which also depends on the character one wishes to give to the piece (and, of course, on the character of the text itself). To this aim, Kircher evidently has to the so-called *Affektenlehre* ("doctrine of affections") in mind, a theory of emotions very popular among Baroque scientists and artists. In musical aesthetics, this theory associates specific emotions (joy, sorrow, etc.) to each syntactic element of musical discourse (intervals, modes, tonalities, etc.)[44]. Thus, relying on this theory, Kircher devises a so-called *Mensa tonographica* (see Figure 5), a table on which, chosen a mode (Lydian, Dorian, Hypophrygian, etc.) in accordance with a specific character (magnificent, amusing, severe, etc.), the correspondence between *musarithmi* and actual notes of the *modus* can be found[45].

Mensa Tonographica.



Qualitas Tonorum	Bellicosus.	Lætus vagus	Lachrymosus.	Hilaris	Amœnus	Pius religiosus.	Triftis querulus.	Vluptuosus.	Jucundus.	fiducia plenus	Mollis vanus	Magnificus.	Seuerus vehemẽs
Nomina antiqua.	Hypolydius.	Hypodorius	Phrygius.	Lydius	Dorius	Dorius	Hypophryg.	Myxolydius.	Hypomyxolydius.	Ionius	Hypoionius	Iaſtius.	Hypoiaſtius.
Signatio.	Mollis	Mollis	Durus.	Mollis	Durus.	Durus.	Durus.	Durus.	Mollis	Mollis	Durus.	Durus.	Mollis
Toni.	VI	II.	III.	V.	VIII	I	IV	VII	VIII	IX	X	XI	XII
F	8	♮7	6	5	4	3	2	♮7	4	3	6	4	8
E	7	b6	5	4	3	2	8	6	3	2	5	3	7
D	6	5	4	3	2	8	7	5	2	8	4	2	6
C	5	4	3	2	8	♮7	6	4	8	♮7	3	8	5
B	4	3	2	8	7	b6	b5	3	7	b6	2	7	4
A	3	2	8	7	6	5	4	2	6	5	8	6	3
G	2	1.8	♮7	6	5	4	♮3	8	5	4	7	5	2
F	1.8.	7	6	5	4	3	2	7	4	3	6	4	1

Figure 5. *Mensa tonographica* for the correspondence between *musarithmi* and actual notes of each *modus*[46].

[44] D. Glüxam, *"Aus der Seele muß man spielen...": Über die Affekttheorie in der Musik des 17. und 18. Jahrhunderts und ihre Auswirkung auf die Interpretation*, Hollitzer Wissenschaftsverlag, Wien 2020.

[45] Kircher's *Mensa tonographica*, displayed in Figure 5, actually contains errors and inaccuracies as to accidentals, deriving from the adaptation of Glarean's old church modes in the new system of scales Kircher exposes in the first part of his work (see e.g. U. Scharlau, *Athanasius Kircher (1601-1680) als Musikschriftsteller: Ein Beitrag zur Musikanschauung des Barocks*, in «Studien zur hessischen Musikgeschichte», Bärenreiter-Verlag, Kassel 1969, p. 178ff.). Such errors were already noticed and corrected Kircher's students (see e.g. K. Schott, *Magia universalis natura et artis*, Joannis Arnoldi Cholini, Bambergae 1674, Volume 2, p. 392ff.).

[46] From A. Kircher, cit., p. 51.

Indeed, should we choose for our *Veni Creator* a cheerful character (*Hilaris*), and therefore Lydian minor as our *modus* (corresponding to a *B*♭ major in modern tonal system), this would be the result according to the *Mensa tonographica*:

5	5	5	4	3	2	2	1
8	7	8	8	8	7	7	8
3	2	3	6	5	5	5	5
8	5	3	4	1	5	5	1
Ve	-ni	Cre	-a-	tor	Spi	-ri-	tus

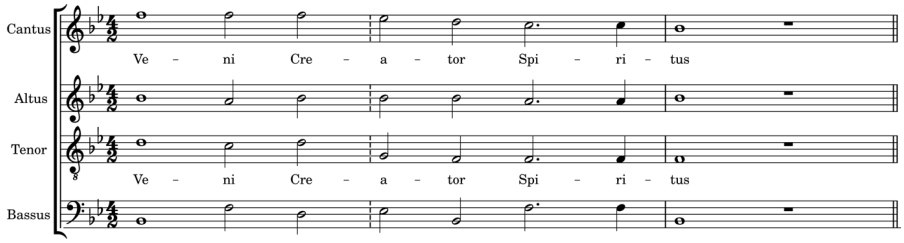
→

Qualitas Tonorum.	Hilaris.
Nomina Antiqua.	Lydius.
Signatio.	Mollis.
Toni	V
F	5
E	4
D	3
C	2
B	8 (=1)
A	7
G	6
F	5

→

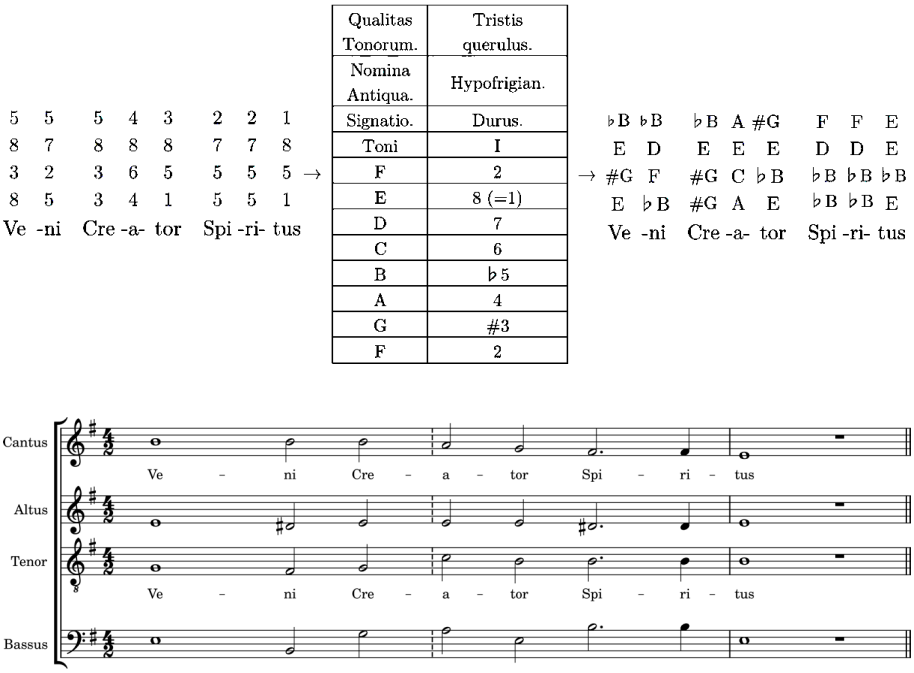
F	F	F	E	D	C	C	B
B	A	B	B	B	A	A	B
D	C	D	G	F	F	F	F
B	F	D	E	B	F	F	B
Ve	-ni	Cre	-a-	tor	Spi	-ri-	tus

Then, by associating to these pitches the first rhythmic scheme of the *Notae temporis* table of *Pinax VI*, we can complete our composition, in modern musical notation:



Otherwise, should we choose a sad character (*Tristis, querulus*), and therefore Hypofrigian major as our *modus* (corresponding to an E minor in modern tonal system), the result (taking the same note values as before), would be different (even if, in this, case, expressively not appropriate to the affective character of the text)[47]:

[47] Notice that accidentals have to be adjusted – see Footnote 5.



Obviously, not every result produced by means of the *Musarithmica mirifica* is equally significant or enjoyable from an aesthetic point of view. Nevertheless, it is interesting the fact that, in this system, as seen, given a textual input, always different musical pieces can be generated, and this only by following combinatorial and algorithmic rules. In making music dependent on combinatorial procedures, Kircher indeed already reveals a technique which 20th century composers will adopt – e.g. Karlheinz Stockhausen in *Klavierstück, N 11* (1956). And even more interesting is the fact that Kircher's *Musarithmica* has emotive character as a parameter to set for the production of the musical output, which indeed anticipates an intuition of 20th century research in AI, namely *Affective Computing*, aiming at making machines and artificial systems able to express and understand human emotions.

In addition to his "software" for automatic music composition[48], Kircher also conceived a sort of "hardware" in which the *Musarith-*

[48] Interestingly, Kircher's systems has been really digitally implemented as a computer software (see A.A. Cashner, *Athanasius Kircher's Arca musarithmica (1650)*

mica mirifica could be implemented: the *Arca musarithmica*. The *Arca* is basically a wooden box, containing small wooden boards with engraved all the *pinaces* of the *Musaritmica*, and a cover with engraved the *mensa tonographica* (see Figure 6). It is thus not properly a mechanical device, as someone has defined it[49], because a human operator is still needed for making it work. Nevertheless, it may be considered an ancestor of modern computers in that it *stores* a "program" (*pinaces*, *mensa tonographica*, etc.) and all the formal rules for automatically composing music from an input, and in that it amounts to one of the first attempts to build «a comprehensive *representation of knowledge* in a chosen field of discourse», i.e. music[50].

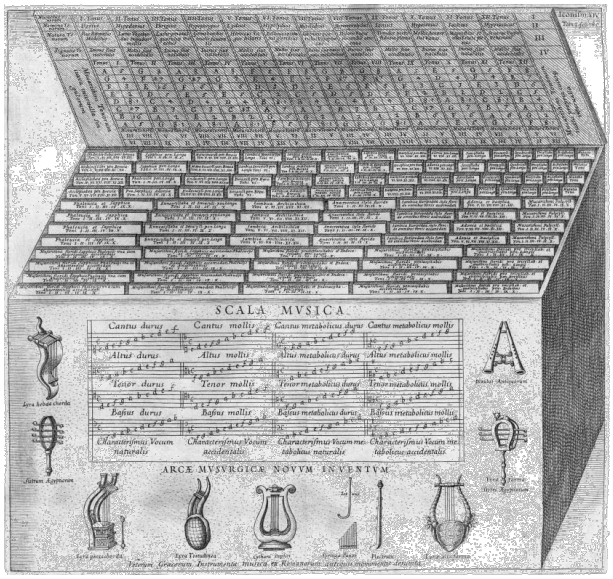


Figure 6. Kircher's *Arca musarithmica*[51].

as a Computational System, in «Arca musarithmica: A Device for Automatic Music Composition from 1650», Peacemaker Press, Rochester (NY) 2022 – see https://www.arca1650.info/index.html.

[49] See e.g. F.K. Prieberg, *Musica ex machina. Über das Verhältnis von Musik und Technik*, Verlag Ullstein, Berlin-Frankfurt-Wien 1960, p. 182.

[50] G. Nierhaus, *Algorithmic Composition: Paradigms of Automated Music Generation*, Springer Science & Business Media, Berlin-New York 2009, p. 26 (my italics) – see also A.A. Cashner, cit.

[51] From A. Kircher, cit., pp. 185-186.

The *Arca* – of which survived exemplars can be found in Europe and Mexico[52] – concretized in a material object the music composition system invented by Kircher, and should allow a person to operate it in an easy and "user-friendly" way. One of Kircher's stated purposes, in fact, was to enable even people with no musical knowledge to compose music, indeed just by following the formal rules of his system. Among such people, for example, there were especially Jesuit missionaries occupied in evangelizing South America, who could use the system, "incarnated" in a transportable wooden box, for increasing the incisiveness and efficacy of their work, for example by putting to music, without being composers, Christian hymns translated into the languages of the natives[53].

But, in the *Musurgia universalis*, Kircher did not limit himself only to devising a system of automatic music *composition*. In *Pars V* of the book, the *Musurgia thaumaturga* or *De omnis generis Instrumentis Musicis Automatis, sive Autophonis* ("Of Musical Instruments or Autophones of all kinds"), he also introduces the subject of automatic music *performance*.

Actually, mechanical devices for automatic musical performance are not a specific invention by Kircher. In fact, made of wood and metal, powered by flowing water, steam, weights or manpower causing the movement of air, springs and indented rolling wheels, automatic artificial instruments were common far before early modern era[54]. In classical antiquity, sources about Ctesibius (285-222 BC) and Heron of Alexandria (10-70 AD), for example, deliver information

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[52] A.A. Cashner, *Kircherizers and Trisectors: Athanasius Kircher's Automatic Composition System in the Spanish Empire*, in «Anuario Musical», (77), 2022c, pp. 51-75.

[53] A. Kircher, cit., p. 2; D. Pastine, *La nascita dell'idolatria: l'Oriente religioso di Athanasius Kircher*, La nuova Italia Editrice, Firenze 1978, pp. 1-33; A.A. Cashner, pp. 51-75.

[54] See e.g. C.B. Fowler, *The Museum of Music: A History of Mechanical Instruments*, in «Music Educators Journal», 54 (2), 1967, pp. 45-49; T. Koetsier, *On The Prehistory of Programmable Machines: Musical Automata, Looms, Calculators*, in «Mechanism and Machine Theory», 36 (5), 2001, pp. 589-603; Y.-H.Chen, M. Ceccarelli, H.-S. Yan, *A Historical Study and Mechanical Classification of Ancient Music-Playing Automata*, in «Mechanism and Machine Theory», 121, 2018, pp. 273-285.

about the first designs in history of mechanical singing birds[55]. In 9th century, the brothers Mus¯a¯ in Baghdad described the first programmable musical machine, an automatic flute player powered by air[56]. During late Middle Ages and early Renaissance, mechanical carillons and water clocks began to be built in the towers of churches and city halls all over Europe. By the mid-17th century, automatic water organs often adorned gardens, artificial grottos, palaces and villas of rich aristocrats[57], who commissioned composers music written specifically for these particular instruments.

In the *Musurgia*, Kircher gives some notions on the building process of automatic water organs and describes their operating principles (Figure 7). Roughly, in such instruments water is used both for moving pressurized air into the organ pipes in order to make them sound, and to activate a rotating cylinder, the *cylindrus phonotacticus*, by falling on a paddle-wheel connected with it. The cylinder is the very heart of the instrument, in that it contains all musical information about the composition one wishes the organ to play. On it, pins and bridges (respectively for short and long notes) are suitably arranged. As the cylinder rotates, they move levers connected with specific keys of the organ, making it sound according to the musical score.

Kircher's designs became famous among European organ builders. On them, various automatic instruments were actually built, such as

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[55] B. Woodcroft, *The Pneumatics of Hero of Alexandria*, Taylor Walton and Maberly, London 1851; M. Ceccarelli, *Distinguished Figures in Mechanism and Machine Science: Their Contributions and Legacies*, Springer Netherlands, Dordrecht 2007.

[56] Isma'il ibn al-Razzaz al-Jazarī, [*Kitab fi Ma'rifat al-Hiyal al-Handasiyya*], en. translation by D.R. Hill, *The Book of Knowledge of Ingenious Mechanical Devices*, D. Reidel Publishing Company, Dordrecht, Boston and London 1979; A.Y. al-Ḥassan, *Islamic Technology. An Illustrated History*, Cambridge University Press and Unesco, Paris 1986; Isma'il ibn al-Razzaz al-Jazarī, [*Kitab fi Ma'rifat al-Hiyal al-Handasiyya*], en. translation by D.R. Hill, *The Book Knowledge of Ingenious Mechanical Devices*, Elite Publishers, Islamabad 1989; E.B. Paz, M. Ceccarelli, J.E. Otero, J.L.M. Sanz, *A Brief Illustrated History of Machines and Mechanisms*, Springer Science & Business Media, Dordrecht 2010; M. Krzyzaniak, *Prehistory of Musical Robots*, in «Journal of Human-Robot Interaction», 1 (1), 2012, pp. 78-95.

[57] A famous example is the water organ build by Claude Venard in 1571 for the Villa d'Este in Tivoli (Rome, Italy).

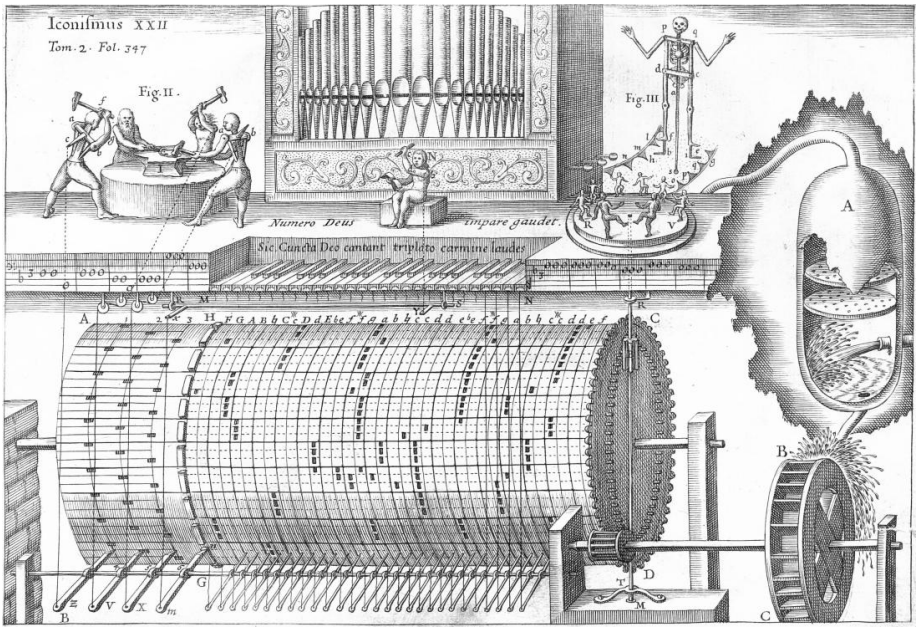

Figure 7. Kircher's design of an automatic water organ[58].

the organ of the Quirinale (Rome) by Matteo Marione (1647), powered by water and able to play different madrigals automatically by a rotating cylinder. Also, thanks to Kircher, rotating cylinders themselves became the archetype of automatic musical technology in eighteenth and nineteenth century. Carillons, musical automata, etc. were, in fact, all based on this kind of device.

3.2.3 Eighteenth and Nineteenth Century

Kircher theoretical work about music is undoubtedly a turning point in the history AIM. He in fact explicitly applies to music formal reasoning, mathematics and combinatorics, doing that deliberately and intentionally for creating the first true system of algorithmic music composition.

The *Musurgia universalis*, like other works by the German Jesuit polymath, became rapidly known in Europe, Africa, Asia and America, especially thanks to the Society of Jesus, which acted as a special network al-

[58] From A. Kircher, cit., pp. 347-348.

lowing the worldwide dissemination of information[59]. During early 18th century, the book was even treated as a standard text of music history and theory[60]. Yet, this did not prevent Kircher's ideas to be strongly criticized as an expression of the stagnant Catholic and post-Galilean culture of science[61]: at the time of the Scientific Revolution, when Aristotelian physics was being dismissed and the science of music itself was abandoning the mathematical speculations of the past for acquiring a new ontology based on the physics of waves, beats, etc.[62], Kircher's musical and scientific ideas, still based on an Aristotelian conception of nature and too far away from contemporary developments in the newborn science of acoustics, appeared as nothing more but mere erudition, curious but eventually useless for further advancements of knowledge.

Also, for these reasons, the scientific interests in Kircher's systems of automatic music composition and performance (and in Kircher in general) faded out during the 18th and the 19th century, growing again only in mid-20th century. Yet, in this timespan, the interest itself of composers and technicians in automatic music composition and performance did not disappear at all.

The 18th century, in particular, was very prolific from this point of view. Already in the first half of the century, in fact, new methods for disentangling musical compositions from human composers were conceived. One of such methods was, for example, the use of dice in music composition for introducing randomness and chance in the music writing process, and for limiting the freedom of the composer in taking creative decisions. At least twenty *Musikalische Würfelspiele*, literally "musical dice games", were published until early 19th century[63]. They were

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[59] P. Findlen, *A Jesuit's Books In The New World: Athanasius Kircher And His American Readers*, in P. Findlen (editor), *Athanasius Kircher: The Last Man Who Knew Everything*, Routledge, New York-London 2004, pp. 329-64, p. 330.

[60] Ivi, p. 329.

[61] P. Findlen*, The Janus Faces of Science in the Seventeenth Century: Athanasius Kircher and Isaac Newton*, in M.J. Osler (editor), *Rethinking The Scientific Revolution*, Cambridge University Press, Cambridge 2000, pp. 222ff.

[62] See e.g. H. Cohen, *Quantifying Music. The science of music at the First Stage of the Scientific Revolution, 1580-1650*. Reidel, Dordrech 1984.

[63] S.A. Hedges, *Dice Music in the Eighteenth Century*, in «Music & Letters», 59 (2), 1978, pp. 180-187.

generally supposed to enable persons ignorant of music to write minuets, marches, polonaises, etc. by selecting portions (phrases, bars, notes, chords, melodies, voices, etc.) of precomposed music to be then mixed casually according to the tosses of a dice. Far from being just games, however, they represented another true example of the «marriage of mathematics and music»[64], in that they embodied some of the latest developments of the time in the research about the mathematical *ars combinatora*. This merger of music and combinatorics turned out to be a powerful methodological tool for the professional composer as well, who could access, by it, an inexhaustible source of melodic material[65].

One of the most famous musical dice games known is *Der allezeit fertige Polonoisen- und Menuettencomponist* ("The always ready minuet and polonaise composer"), published in Berlin by the German composer Johann Philipp Kirnberger (1721-1783)[66]. Following the rules of this game, one can compose four-voices minuets (two-parts of eight bars each, in D major and ³⁄₄), three-voices polonaises (two-parts of six and eight bars each, in D major and ³⁄₄) or trios (two-parts of eight bars each in D minor and ³⁄₄). The musical material needed for the game is given in advance and consists of single precomposed musical bars written on numbered cards. Tables of numbers (respectively for minuets, polonaises and trios) are given for associating the number yielded by the toss of one or two dice with the number on the cards. After throwing the dice a suitable number of times according to the number of bars needed by the piece, one can then assembly the finished musical composition (for an example with the polonaise – see Figure 8).

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[64] Ivi, p. 185.

[65] C. Nolan, *On Musical Space and Combinatorics: Historical and Conceptual Perspectives in Music Theory*, Winfield, Kansas 2000; S. Klotz, *Kombinatorik und die Verbindungskünste der Zeichen in der Musik zwischen 1630 und 1780*, Walter de Gruyter, Berlin 2014; N. Collins, *Origins of Algorithmic Thinking in Music*, in A. McLean, R.T. Dean (editors), *The Oxford Handbook of Algorithmic Music*, Oxford University Press, Oxford 2018.

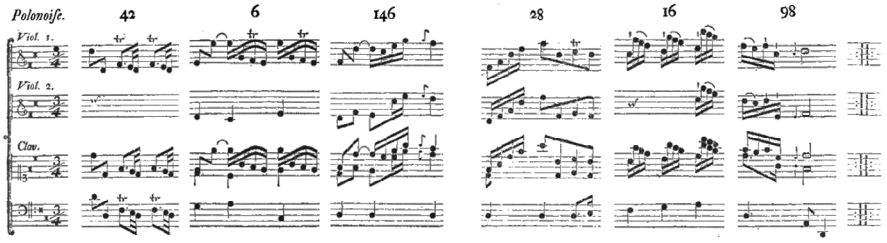
[66] J.P. Kirnberger, *Der allezeit fertige Polonoisen- und Menuettencomponist*, George Ludwig Winter, Berlin 1757.

Tabelle der Würfe zu Polonoiſen.

Zum erſten Theile.

mit einem Würfel	1	2	3	4	5	6					
mit zwey Würfeln	2	3	4	5	6	7	8	9	10	11	12
1 Wurf	70	10	(42)	62	44	72	114	123	131	138	144
2 " "	34	24	(6)	8	56	30	112	116	147	151	153
3 " "	68	50	60	36	40	4	126	137	143	118	(146)
4 " "	18	46	2	12	79	(28)	87	110	113	124	128
5 " "	32	14	52	(16)	48	22	89	91	101	141	150
6 " " .	58	26	66	38	54	64	88	(98)	115	127	154

(a)



(b)

Figure 8. "Toss Table for Polonaises. For the first part"[67]. Let us suppose, for example, we want to compose the first part of a polonaise (six bars) using two dice. We toss them the six times required, obtaining 4, 4, 12, 7, 5, 9 as results, which respectively correspond, according to the table, to card numbers 46, 6, 146, 28, 16, 98 (a). After having retrieved the cards[68] and copied their content on a sheet, we finally obtain the correspondent composition (b), completely reasonable from a musical point of view.

Obviously, the musical material derives from a minuet, a polonaise and a trio Kirnberger had composed beforehand with ten variations

[67] Ivi, p. 7.
[68] Ivi, pp. I-XVI.

each. The eleven compositions obtained for each musical form have been then cut into single bars, and bars with the same position in the piece but from different variations[69] grouped together, shuffled and numbered with a figure from the table. Albeit simple in principle, the game offers very large creative possibilities thanks to combinatorics: For the polonaise, there are 11^{14} possible bar combinations, i.e. possible different pieces to be composed, and 11^{32} for the minuet and trio.

Being the earliest, Kirnberger's system allegedly served as a model for other later musical dice games, which were published in Germany, England and Italy mostly as expansions or variations of *Der allezeit fertige Polonoisen- und Menuettencomponist*. Among the most interesting ones, there are, for example, Carl Philipp Emanuel Bach's *Einfall* (Berlin, 1758) – which even introduced the possibility to compose double counterpoints, Pierre Hoegi's *Tabular System* (London, 1770), Luigi Marescalchi's *Gioco filharmonico* (Naples, 1793) – erroneously attributed to Franz Joseph Haydn, or the famous *Anleitung zum Componieren von Walzern so viele man will vermittelst zweier Würfel, ohne etwas von der Musik oder Composition zu verstehen* ("Instructions for the composition of as many waltzes as one desires with two dice, without understanding anything about music or composition", 1793) – commonly attributed to Wolfgang Amadeus Mozart, even if without sufficient musicological and historical evidence.

During an age, the Enlightenment, in which science and mathematics were acquiring a great relevance as modes of viewing, and living in, the world, such games, which extended the range of applicability of combinatorics, chance and probability to music, became very popular[70]. Interestingly, the same idea from which they came to light – making music a human-independent product of chance – was taken again into account during the 20th century, by composers such as John Cage and Iannis Xenakis who were trying to escape the determinism of tonality and serialism[71].

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[69] This, in order to preserve the harmonic progression of the original composition across all possible arrangements of the bars.

[70] G. Nierhaus, cit., p. 36ff.; S.A. Hedges, cit., pp. 184-185.

[71] A. Alpern, *Techniques for Algorithmic Composition of Music*, in «Computer Science», 95, 1995, p. 120, p. 2; G. Nierhaus, cit., p. 39.

But the 18th century was also the time in which new advancements were made in automatic music performance. Protagonists, in this respect, were above all French, German and Swiss clockmakers, who improved clock mechanisms integrating in them rotating cylinder, small pipe organs or moving flute-playing figures able to perform complex melodies, which were in some cases composed even by renowned composers of the time such as Händel, Mozart, Hayden, Beethoven, etc.[72] Yet, the most impressive inventions of the century were the musical androids, which can be considered the true ancestors of modern robots[73]. In contrast to musical clocks, in which mechanism and musical instrument could not be distinguished, such human-looking mechanical figures were able to perform on real, life-size musical instruments, detached from their mechanism. Activated, as usual, by rotating cylinders, their movements included not only the articulation of the fingers on a keyboard or on a flute, but also breathing, changes in facial expression as well as in the movements of the eyes, arms and head. Musical androids, in fact, were not only supposed to play music, but also to express emotions in accordance with the character of the music played. No emotionless human-like automaton would have been in fact seen as musically convincing in a socio-cultural context like that of the time, in which communication of affects and bodily motions were considered part of musical performance and musical aesthetic[74].

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[72] A. Buchner, *Mechanical Musical Intruments*, Batchworth Press, London 1960, pp. 70-72.

[73] A. Chapuis, E. Droz, *Les automates: figures artificielles d'hommes et d'animaux: histoire et technique*, Editions du griffon, Neuchatel 1949, en. tr. by A. Chapuis, E. Droz, *Automata: A Historical and Technological Study*, Editions du Griffon, Neuchâtel 1958; D. Margócsy, *Androids in the Enlightenment: Mechanics, Artisans, and Cultures of the Self*, in «Annals of Science», 72 (3), 2015, pp. 407-409; B. Westermann, *The Biomorphic Automata of the 18th Century. Mechanical Artworks as Objects of Technical Fascination and Epistemological Exhibition*, in «Figurationen», 17 (2), 2016, pp. 123-137.

[74] See e.g. C.P.E. Bach, *Versuch über die wahre Art das Clavier zu spielen*, Volume 1, Christian Friedrich Henning, Berlin 1753, pp. 115-133; A. Voskuhl, *Androids in the Enlightenment: Mechanics, Artisans, and Cultures of the Self*, University of Chicago Press, Chicago 2019, pp. 160ff; A. Voskuhl, J. Riskin, *Motions and Passions: Music-Playing Women Automata and the Culture of Affect in Late Eighteenth-Century Germany*, in J. Riskin, *Genesis redux: Essays in the History and Philosophy of Artificial Life*, University of Chicago Press, Chicago 2012.

One of the most famous 18th century musical androids is *Le Flûteur* by the eminent French inventor Jacques de Vaucanson (1709-1782)[75] – see Figure 9.

Figure 9. Vaucanson's *Le Flûteur* (1738) – detail from the poster for the presentation of Vaucanson's automata in Strasbourg (1746)[76].

Inspired by *Le Berger flûteur* – a marble sculpture by Antoine Coysevox (Jardin des Tuileries, 1716) – it was built between 1737 and 1738 and made capable of playing twelve different melodies. The first exhibitions of the automaton to the public took place in 1738 in Paris, where it was visited also by the members of the *Académie royale des sciences*, who gave their approbation to the work. From 1741, together with other two automata by the same author, *Le Joueur de tambourin* and *Le Canard digérateur*, the flutist began a long travel across French,

[75] A. Doyon, L. Liaigre, *Jacques Vaucanson, mécanicien de génie*, Presses Universitaires de France, Paris 1966, pp. 49-108 in pt.

[76] Engraving in H.R. d'Allemagne, *Histoire des jouets*, Librairie Hachette, Paris 1902.

Italy, England, the Netherlands, Germany and Austria, where, after having had several owners, it was allegedly exhibited for the last time in mid-19th century before completely disappearing without trace[77].

In a *mémoire* presented to the *Académie*, Vaucanson described his automaton and explained all the physical and mechanical principles behind it[78]. The automaton was composed of a life-size human figure of about 5.5 foot (1,70 m) tall, placed on a pedestal of 4.5 foot (1,40 m) hiding large part of the mechanism that made the figure move and play. The figure held in the hands a real Baroque transverse flute, which could be replaced with other flutes of the same kind without consequences on automation and performance. Sound was produced by the automation itself: a crank mechanism activated bellows in the pedestal, which pumped air up to the mouth of the figure. Air was then blown into the instrument, producing sound. In the mouth, suitable movements of the tongue-controlled quantity and pressure of the air to be emitted in accordance with the frequency of the notes to be played[79]. The di erent notes were finally produced by proper positioning of the fingers on

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[77] The veridicality of this information, however, was denied already in 1882: «The automatic flutist is not in Vienna, as generally believed», in É.M. Charton (editor), *Vaucanson*, in «Le Magasin pittoresque», 50, 1882, pp. 121-122, my translation.

[78] J. de Vaucanson, *Le mécanisme du flûteur automate*, Jacques Guerin, Paris 1742, en. tr. by J.T. Desaguliers, *An Account of the Mechanism of an Automaton, or Image Playing on the German-Flute*, T. Parker, London 1738, pp. 9ff.

[79] The regulation of air emission, air pressure, tone frequency, etc. required Vaucanson to undertake a prior analysis of all the physic-acoustical, anatomical and music-technical aspects of flute playing, which he did in the first part of the *mémoire* (Ivi, pp. 4-10). From a certain point of view, in fact, one may think to *Le Flûteur* as an experimental apparatus built by Vaucanson with the aim of empirically proving his acoustical (see. J. Riskin, *The Restless Clock. A History of the Centuries Long Argument over What Makes Living Things Tick*, University of Chicago Press, Chicago and London 2021) – his considerations about acoustics and flute technique, however, were not entirely accepted as accurate by the experts of the time (see e.g. J.J. Quantz, *On Playing the Flute*, E.R. Reilly (translator), Faber and Faber, London 1966. Original work: *Versuch einer Anweisung die Flöte traversiere zu spielen*, Johann Friedrich Voß Verlag, Berlin 1752). In general, as Riskin (cit., pp. 11-77) stresses, 18th century automata are all to be seen as scientific apparatuses in the larger context of 18th century scientific culture. Differently from previous musical automations, they are not (only) objects aimed at amusing the public, but true scientific instruments aimed at studying biological or physical processes by *simulating* them.

the holes of the flute. The movement of the fingers, covered with leather to imitate the softness of human skin on the flute holes, was controlled by a system of levers activated by the rotation of a pegged cylinder. As in previous clocks and Kircherian water organs, the cylinder "stored" all musical information and could be "programmed", by opportune arrangement of the pins, with several different melodies.

In a letter to abbot Pierre-François Guyot Desfontaines, attached to the *mémoire*, Vaucanson also reported that, thanks to such complex mechanisms, the automatic flute player – like his other musical automaton, the pipe and drum player – was able to outperform human flutists in the precision of the performance, especially for what concerns fast passages, whereby it is generally difficult to obtain notes which are always both clear and in tune[80]. Interestingly, this statement triggered some critical reactions among musicians and theorists of the time. One of these was for example that expressed by Johann Joachim Quantz (1697-1773), German flutist, composer and flute teacher of Frederick II of Prussia. With a clear reference to Vaucanson's automata, in his popular handbook on flute playing Quantz wrote:

> With skill a musical machine could be constructed that would play certain pieces with a quickness and exactitude so remarkable that no human being could equal it either with his fingers or with his tongue. Indeed it would excite astonishment, but it would never move you; and having heard it several times, and understood its construction, you would even cease to be astonished[81].

In the same vein, the French intellectual Ange Goudar (1708-1791) wrote in a letter from:

> Since Mr. de Vaucanson had a piece of wood dressed as a man perform a great flute concerto, [dancing for an automaton] is practicable; but I challenge Mr. de Vaucanson and all the machinists on earth to make an artificial face that expresses the passions, because to express the passions of the soul, a soul is needed[82].

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[80] J. de Vaucanson, cit., p. 21.

[81] J.J. Quantz, cit., p. 131.

[82] A. Goudar, *Lettre d'un des petits oracles de M. Campioni au grand Pitrot*, Publisher: n.d., Place: n.d. 1772, p. 13, my tr.

Questioning the aesthetic and expressive value of artificially produced music, these thoughts amount to the first-ever philosophical skepticisms in history towards algorithmic music, automatic performance and artificial creativity, skepticisms which are still today debated in the philosophy of AIM[83].

Inspired by Vaucanson's pioneering work, also other musical automata were built during the 18th century. Among the most known ones there are for example *La musicienne* (or *The Harpsichord Player*), built by the Jaquet-Droz family in La Chaux-de-Fonds (Switzerland) between 1767 and 1774[84], and Peter Kinzing's and David Roentgen's *Dulcimer Player*, build in Neuwied (Germany) between 1783 and 1785. Both automata worked on nearly the same mechanical principles (cylinders, levers, cranks, etc.) applied by Vaucanson, expressed emotions by suitable movements of eyes, chest, head, etc. and played real musical instruments, detached from their internal mechanism. Differently from Vaucanson's automata, though, they have survived until present times, and can be seen and heard respectively at the Museum of Watches in Le-Chaux-de-Fonds and at the Musée des arts et métiers in Paris.

A true flourishing of the technology which "animated" 18th century musical automata took place however during the century afterwards. In 19th century, in fact, machines entered factories, and the production processes in many industrial fields went through a phase of growing automatization. Textile industry was the first to experience such changes. Basing on a previous invention by Vaucanson (1740), in 1804 Joseph Marie Jacquard patented a loom capable of automatically reproducing complex patterns on textiles. The device could be "programmed" for a specific pattern by means of punched cards linked together in a continuous sequence. Cards were nothing but an improved version of the cylinders operating in the musical clocks and automata of the century before, playing their same role in machines as *means of transfer for information*.

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[83] A.M. Gioti, *From Artificial to Extended Intelligence in Music Composition*, in «Organized Sound», 25 (1), 2020, pp. 25-32.

[84] C. Perregaux, *Les Jaquet-Droz et leurs automate*, Wolfrath & Sperlé, Neuchâtel 1906; C. Perregaux, F.L. Perrot, *Les Jaquet-Droz et Leschot*, Attinger, Neuchâtel 1916; A. Voskuhl, *Androids in the Enlightenment: Mechanics, Artisans, and Cultures of the Self*, University of Chicago Press, Chicago 2019.

On punched cards was based also the project of one of the most eminent ancestors of modern general-purpose programmable computers, the *Analytical engine* by Charles Babbage (1837). Ada Lovelace (1815-1852), self-taught mathematician and collaborator of Babbage, even noticed the great possibilities deriving from programming the engine for music composition:

> The operating mechanism [of the engine] can even be thrown into action independently of any object to operate upon (although of course no *result* could then be developed). Again, it might act upon other things besides *number*, were objects found whose mutual fundamental relations could be expressed by those of the abstract science of operations, and which should be also susceptible of adaptations to the action of the operating notation and mechanism of the engine. Supposing, for instance, that the fundamental relations of pitched sounds in the science of harmony and of musical composition were susceptible of such expression and adaptations, the engine might compose elaborate and scientific pieces of music of any degree of complexity or extent[85].

Yet, the 19th century was not characterized by advancements in algorithmic music composition, to which Lovelace already imagined to apply the formal mechanisms of Babbage's engine decades before the invention of computers and computer music. In comparison to the past, no new systems or formal procedures for automatic music composition were namely introduced. On the contrary, major developments occurred in the field of musical automation.

Other humanoid musical automata were built after the 18th century models by Vaucanson, Jaquet-Droz, etc. Some examples are Kaufmann's Trumpet Player (1810), Maillardet's Organ Player (1820), Marreppe's Violinist (1837) or Manzetti's Flute Player (1840). As usual, they were based on rotating cylinders and pneumatic or mechanical devices for transmitting movements. Still, musical boxes, musical clocks, etc. began to be manufactured on a commercial basis, nearly

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[85] A.K. Lovelace (translator), *Sketch of the Analytical Engine Invented by Charles Babbage [...] With Notes by the Translator*, in «Scientific memoirs», 3 (29), 1843, pp. 666-731. Original work: L.F. Menabrea*, Notions sur la machine analytique de M. Charles Babbage*, in «Bibliothèque Universelle de Genève. Nouvelle Série», 41 (82), 1842, pp. 352-376, p. 694, italics in the original.

as mass-products[86]. They no longer provoked surprise (or emotive repulsion) in the public, becoming a common component of the musical culture of the time, especially as substitutes of musical recordings, possible only with the (later) invention of the phonograph [Roads 1985, 166; Riley 2009; Collins 2018, 7]. Following the trend of the factories after the Industrial Revolution, music performance and music didactic themselves became processes partly driven by automations: In 1816, Johann Nepomuk Mälzel (1772-1838) patented the metronome – having actually stolen the idea from Dietrich Nikolaus Winkel (1777-1826), who designed the device two years before[87].

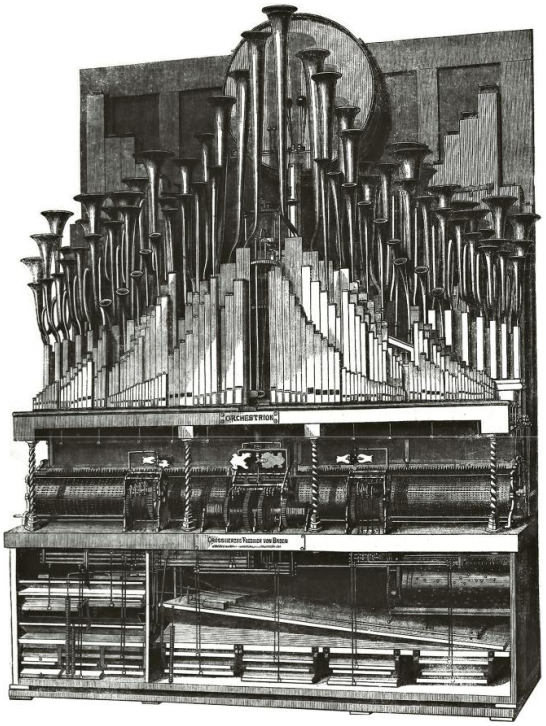

Figure 10. Example of an orchestrion (Welte, 1862)[88]. Notice trumpets and percussions, absent in early musical automata.

[86] A.W.J.G. Ord-Hume, *Cogs and Crotchets. A View of Mechanical Music*, in «Early Music», 11 (2), 1983 pp. 167-171; C. Roads, cit.

[87] N. Collins, cit., p. 8.

[88] G.C. Leighton (editor), in «Illustrated London News», Sept. 20, 41, 1862, p. 321.

Finally, new systems, devices and machines for automatic music performance were developed. The Renaissance cylinder mechanism was shrunk to fit into movable *barrel organs*. Automatic instruments previously involving only organ pipes were being now expanded to include also plucked, blew and struck strings, reeds, trumpets and percussions. Termed – not by chance – *orchestrions*, such instruments were supposed to play like an entire orchestra, being, as usually, controlled and programmed by means of pegged cylinders or punched cards (Figure 10). Notable orchestrion builders in 19th century were Mälzel – for whose *Panharmonicon* (1805) his close friend Beethoven composed the *Wellington's Victory* (Op. 91, 1813) –, Friedrich W. Kaufmann and Michael Welte in Germany. A particular model was the *Componium* (1821) by Winkel. Combining the idea of an orchestrion with the principles behind musical dice games, the *Componium* was the first automatic instrument able to both compose and perform artificial music simultaneously. It consisted of two barrels alternatively playing, two bars each, a variation on a given theme. While the one was playing, the other revolved to a randomly selected sequence of two bars to play next, and vice versa. In this way, it has been calculated, at least 256 million of variations were possible [Collins 2018, 7].

Soon, orchestrion technology was exported even to the United States of America: Emil Welte, Michael's son, started to build orchestrions in New York in 1865. In 1883, he patented the *paper music roll*, an improved version of Jacquard's punched cards for musical automations, which became the heart of another great 19th century music-technological invention: the *pianola*. Designed for the first time by Kaufmann (1851), the first working pianola (also known as *player piano* or *reproducing piano*) was built by the American inventor Edwin S. Votey in 1896. This particular piano, able to automatically play pieces stored on interchangeable paper rolls, became very popular for home musical reproduction during the 20th century, being however replaced by the phonograph and the radio in the 30s.

4. Conclusion

In this paper, I traced the most salient developments in the protohistory of *Artificial Intelligence and Music*, i.e. of the history of artificial music composition and performance before the invention of digital computers and *Artificial Intelligence* itself. As AIM (like AI in general) historically derives from (and still consists in) algorithms, I treated the protohistory of AIM basically as a history of algorithmic music.

I referred my analysis to the timespan between antiquity and nineteenth century. I considered systems conceived by theoreticians of the past in which the use of formal, *algorithmic*, procedures applied to music allowed to compose or perform musical pieces with just partial, or even without, human interventions in the creative music making process – with humans involved being just operators or triggers of those formal or mechanical procedures.

All systems considered, from Guido's *Micrologus*, Kircher's *Musarithmica* to eighteenth-century *Musikalische Würfelspiele* and musical automata are linked by the same *fil rouge*: the relation with mathematical and formal thinking, of which these systems are a concrete form of instantiation, with respect to the musical domain.

With the invention of the digital computer in 20th century and the implementation of *Artificial Intelligence* in the last decades, automatic music composition and performance go through a time of great and constant flourishing. Computers become able to compose music in their own style or in that of renowned composers of the past, whose work they previously analyzed through machine learning and neural network techniques. Robots able to play musical instruments and to interpret music with the same nuances of a human performers appear on the market.

Of course, such recent AIM technologies deserve a historical investigation on their own – which I demand to a future work because of present space constraints. Yet, especially on the basis of the historical investigation carried out in this paper, it is interesting to notice that the idea behind modern AIM – making artificial music possible – is indeed very old, and that several examples of (successful) implementations of it can be found throughout history. Such implementations thus mostly differ from today's AIM not in qualitative, but *quantita-*

tive aspects: modern computers, in fact, seem to realize just in a more efficient, combinatorially powerful, and rapid way the *same* (algorithmic) idea implemented in artificial musical system of the past.

STUDI E RICERCHE

Natural and Unnatural Chrematistics in Aristotle's *Politics*. A Problematic Dichotomy

Sebastiano Taccola

Introduction: Reading Aristotle today

Reading a classic such as Aristotle today presupposes the construction of a hermeneutical relationship between past and present. Being aware of this is the first condition to read classics in a productive way, which aims at the improvement of our perspective through the dialectical polarities of historical contextualization, on the one hand, and of its "relevance", on the either. As Ellen Meiksins Wood has stated:

> There is no inverse relation between historical contextualization and "relevance". On the contrary, historical contextualization is an essential for learning from the 'classics', not simply because it allows a better understanding of a thinker's meaning and intention, but also because it is in the context of history that theory emerges from the realm of pure abstraction and enters the world of human practice[1].

Following this path also means to avoid, as far as possible, the risk of historicism, on the one side, and of anachronism, on the other.

This very brief methodological premise will be clear as soon as we take into consideration the main topic of this paper: Aristotle's presentation of *oikonomia* in the first book of *Politics*.

During the last three centuries, debates focused on the relationship between Aristotle's *oikonomia* and modern economic thought (and, of course, economics) often came up. They mainly concerned questions such as «How much Aristotle can still teach us about economic issues?»; «May he be considered a sort of founding father of eco-

[1] E. Meiksins Wood, *Citizen to Lords: A Social History of Western Political Thought from Antiquity to Middle Ages*, Verso, London-New York 2011, pp. 13-14.

nomic thought?». Such questions are clearly anachronistic; moreover, they presuppose a sort of idealistic eternisation of current mainstream definitions of notions such as "economy", "science", "method", etc.

As an example we could take Joseph Schumpeter, who, in his *History of economic analysis*, praised Aristotle's presentation only for its intention, but not for its theoretical foundation, since it was still embedded in a «decorous, pedestrian, slightly mediocre, and more than slightly pompous common sense»[2]. Therefore, according to Schumpeter, Aristotelian *oikonomia* does not satisfy the modern criteria of what he calls economic analysis, whose history is to be identified with «the intellectual efforts that men have made in order to understand economic phenomenon or, which comes to the same thing, the history of the analytic or scientific aspects of economic thought»[3]. Aristotle is at the margins of this history.

In this case, not only Schumpeter presupposes and naturalizes the definition of economy, but he also identifies the knowledge of economic phenomena with economic analysis. Following this thread, Schumpeter gives a definition of economic science which is, at the same time, historically too broad (since it is considered as a touchstone, which is potentially valid for every epoch of the history of science) and too narrow (since it is exclusively observable within the frame of the quantitative paradigm presupposed by the model of economic analysis).

Schumpeter undeniably assumes a modern and one-sided definition of economic analysis, turns it into a paradigm and simply attests that Aristotelian inquiry is not in compliant with such a paradigm[4].

This interpretation is anachronistic and systematically founded on the abuse of the present over the past[5]. It could be a perfect example

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[2] J. Schumpeter, *History of Economic Analysis*, Routledge, London 2006, p. 54.

[3] Ivi, p. 3.

[4] According to Scott Meikle, the Humean critique to Aristotelian ontological categories have influenced the theoretical framework of classical and neo-classical economic thought. As Meikle writes, «economists have shown a marked predilection for Humean metaphysics» (S. Meikle, *Aristotle's economic thought*, Clarendon Press, Oxford 1995, p. 18). This could explain why the background of modern economic thought is so incapable of comprehending Aristotle's perspective.

[5] This metaphor is used by M. I. Finley, *The Use and Abuse of History*, Chattus & Windus Ltd, London 1971, to criticize anachronistic approaches to ancient societ-

of what Carlo Ginzburg has labelled as «ventriloquism», «a professional illness many historians succumb to»[6]. In this paper, I will try to follow another path, grounded on the inner interconnection between historical contextualization and relevance.

Satisfying need through exchange

At the very beginning of *Politics*, Aristotle describes the *polis* as a living organism that is able to satisfy human needs in the most perfect way. In this part he mainly focuses on the *oikos*, the simplest form of natural association, in which it is possible to underline the essential conditions of existence and reproduction of the human being. According to Aristotle, these conditions rely on three kinds of relationship: a) the husband-wife relationship, whose end is the biological reproduction of the humankind; b) the educational relationship between father and children; c) the division of labour expressed by the master-slave relationship – in this context, the slave is a «technological necessity»[7], whose manual labour provides all the necessary goods[8].

Oikonomia, then, consists of the administration of the household in all its plural relationships. For Aristotle, the *oikos* is a fundamental

ies. So it is very surprising to see Finley, in contradiction with his anti-anachronistic standpoint, sharing Schumpeter's definition of economic analysis in an article entitled *Aristotle and economic analysis*, see: M. I. Finley, *Aristotle and economic analysis*, «Past & Present», 19/1970, pp. 3-25. In the last few decades, there has been an attempt to restore anachronism as a feature essential to historical inquiry; see: N. Loraux, Éloge de l'anachronisme en histoire, «Clio», 87-88/2004, pp. 127-139; J. Rancière, *Le mots de l'histoire*, Éditions du Seuil, Paris 1992.

[6] C. Ginzburg, *Our words and theirs*, in S. Fellman, M. Rahikainen, *Historical knowledge. In quest of Theory, Method and Evidence*, Cambridge, Cambridge Scholars Publishing 2012, pp. 97-119, in part. p. 109.

[7] B. Williams, *Shame and necessity*, University of California Press, Berkeley 1993, p. 112.

[8] In the *polis* the productive process was much more articulated and complicated than in the *oikos* and was not completely dependent on slavery. See by E. Meiksins Wood: *Peasent-Citizen & Slave: the foundations of Athenian democracry*, Verso, London – New York 1989, and *Labour and democracy, ancient and modern*, in E. Meiksins Wood, *Democracy against capitalism. Renewing historical materialism*, Verso, London – New York 2016, pp. 181-203.

institution because it constitutes the background for the genesis of the individual as a citizen and a political and economic subject[9]. But, *oikonomia* also evokes a set of economic issues related to the conditions of possibility of commercial transactions and trades in the vital centres of the physiology of the *polis*, i.e. the agora and ports[10].

Chrematistics

As already pointed out, three different relationships compose *oikonomia*: marriage, parenthood, mastership; but, as Aristotle states,

> Besides the three factors which thus present themselves for examination there is also a fourth, which some regard as identical with the whole of household management, and others as its principal part. This is the element called 'the art of acquisition'; and we shall have to consider its nature[11].

Here Aristotle begins to address the problem of chrematistics. He asks himself which is the relationship between *oikonomia* and chrematistics: is chrematistics identical to *oikonomia* or simply a part of it? According to Aristotle, they must be different because they have different ends: chrematistics is the technique of acquiring goods; *oikonomia* regards the use, management, and consumption of goods. And yet the question still remains: does chrematistics provide the necessary means to satisfy natural needs (and therefore it is still within the domain of *oikonomia*), or does it aim at a potentially limitless accumulation of goods? This issue forces us to take into consideration the ambiguity implicit in the word "chrematistics": on the one side, it recalls

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[9] See: M. Vegetti, *L'io, l'anima, il soggetto*, in S. Settis, *I Greci*, vol. I, Einaudi, Torino 1996, pp. 431-467.

[10] See: M. Vegetti, *Polis ed economia nella Grecia antica*, Zanichelli, Bologna 1976; S. Campese, *Polis ed economia in Aristotele*, in M. Vegetti, D. Lanza, *Aristotele e la crisi della politica*, Liguori, Napoli 1977, pp. 13-60; S. Meikle, *Aristotle and the political economy of the polis*, «Journal of Hellenic Studies», 99/1979, pp. 57-73; M. Venturi Ferriolo, *Aristotele e la crematistica. La storia di un problema e le sue fonti*. La Nuova Italia, Firenze 1983.

[11] Aristotle, *Politics*, trans. by E. Barker, Oxford University Press, Oxford 1998, 1253b, 12-14.

the word "*chrema*", i.e. the thing that can satisfy the *chreia*, the natural need; on the other side, it means the art of accumulating *chremata* and money-making. This semantic duplicity reveals its own effectiveness if it is seen within the conceptual framework *oikonomia* evokes and defines.

The end of *oikonomia* is the self-sufficiency of the household through the consumption of those goods that are needed. In according with real and natural wealth, need represents the natural (*kata physin*) limit, that can't be crossed by the acquisition of goods. So-as Aristotle states following this thread-there are two different kinds of chremastics: a natural one, which is a part of household management, is embedded with the natural limits of *chreia*, and procures the necessary goods through natural means; and an unnatural one, which aims at a limitless acquisition of monetary wealth.

Later, Aristotle develops this original dichotomy between natural and unnatural chrematistics into a series of further dichotomies, that it is possible to sum up in the following way:

Natural Chrematistics	*vs.*	Unnatural Chrematistics
Community/Citizenship	*vs.*	Merchants/Retailers/Usurers (Metics)
Oikos	*vs.*	Agora and Ports
Autarkeia	*vs.*	Commerce
Need	*vs.*	Desire/Monetary Wealth
Limited	*vs.*	Limitless
Quality	*vs.*	Quantity

In the background of these socio-political oppositions, there is an economic one, which is immanent to the exchange of goods in itself: the contrast between use and exchange value[12].

[12] For a similar presentation of Aristotelian economic dichotomies see: R. Seaford, *Aristotelian economics and Athenian tragedy*, «New Literature History», 31/2000, pp. 271-276.

Use and exchange value[13]

In *Politics*, I. 9 Aristotle says:

> All articles of property have two possible uses. Both of these uses belong to the article as such, but they do not belong to it in the same manner, or to the same extent. The one use is proper and peculiar to the article concerned; the other is not. A shoe, for example, can be used both for wearing and for exchange. Both of these uses are uses of the shoe as such. Even the man who exchanges a shoe, in return for money or food, with someone who needs the article, is using the shoe as a shoe; but since the shoe has not been made for the purpose of being exchanged, the use which he is making of it is not its proper and peculiar use. The same is true of all other articles of property[14].

Every product can be used for its quality or be exchanged. In the context of the *polis*, a community which, according to Aristotle, is composed by a plurality of households and villages, no household can be completely self-sufficient; hence, exchange becomes a necessity. The problem is now to identify the different kinds of exchange according to their own specific goals[15]. Aristotle, then, presents a sort of phenomenology of exchange through which he is able to clarify different kinds of exchange in an evolutionary succession, from barter to usury.

Barter is the simplest form of exchange for which a good is exchanged with another one. It is deep-rooted into human being's need and strictly linked to the quality (use value) of the exchanged goods. According to Aristotle, barter is a natural kind of exchange because it is an immediate manifestation of the specific nature of need and of its satisfaction.

Not every need, though, can be satisfied within a single community. For example, a *polis*, according to its own specific geographical position, climatic conditions, productive apparatus, could not have the

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[13] I believe that modern economic concepts such as "use value" and "exchange value" are inextricably connected to the commodity-form assumed by the products of labour in the capitalist mode of production. It is possible to speak about use and exchange value, as well as about commodity, profit, etc. for pre-capitalistic societies only *cum grano salis*, i.e. with the awareness of the specific differences existing between capitalist and pre-capitalist modes of production.

[14] Aristotle, *Politics*, cit., 1257a, 6-14.

[15] See: S. Meikle, *Aristotle on business*, «Classical Quarterly», 46/1996, pp. 138-151.

necessary means to satisfy every need. This is why trade is born. Moreover, in order to make long-distance transactions easier, trade employs money. But, as Aristotle promptly highlights, money is not simply an instrument, since it introduces a new conceptual determination with its genesis: assuming the money-form, exchange value becomes autonomous. Now exchange can be measurable within the mere quantitative frame introduced by money. Aristotle stresses out that money is embodied in particular kinds of commodities which turned out to be useful means to the fluidity of exchanges.

> Such commodities were iron, silver, and other similar metals. At first their value was simply determined by their size and weight; but finally a stamp was imposed on the metal which, serving as a definite indication of the quantity, would save people the trouble of determining the value on each occasion[16].

For Aristotle, in the Commodity-Money-Commodity (C-M-C) circuit, money still plays the role of means of exchange; the end of this kind of exchange still remains use value, i.e. the specific quality of the commodity that is needed. And this is why Aristotle considers this form of exchange necessary and commended.

It is now worth mentioning that money allows the chronological separation between sale (C-M) and purchase (M-C). Therefore, in C-M-C all the conditions of possibility of a form of exchange that aims at the unlimited accumulation of wealth are already posed. The seed of unnatural chrematistics is here: once the sale becomes autonomous and socially prominent, it is sufficient a simple inversion of sale and purchase to explain the passage from C-M-C to M-C-M', that is from selling a singular product in order to buy another one, to buying one's commodity in order to sell it dearer and make a profit. The M-C-M' pushes us into the dominium of chrematistics, whose particular goal is the endless accumulation of wealth. Following the logic immanent to it, we can see how commodity-product can become superfluous and M-C-M' can evolve into an even more unnatural economic process: usury (M-M'), a kind of exchange that allows to make

[16] Aristotle, *Politics*, cit., 1257a, 39-41.

profit only through money. Monetary loan separates money from the purpose according to which it was originally coined:

> Currency came into existence merely as a means of exchange; usury tries to make it increase. This is the reason why it got its name; for as the offspring resembles its parent, so the interest bred by money is like the principal which breeds it, and it may be called 'currency the son of currency'. Hence we ca understand why, of all modes of acquisition, usury is the most unnatural[17].

So, there are two different kinds of chrematistics: natural and unnatural chrematistics. While for the first the object of need represents the beginning and the end of its process of exchange (being money its medium (C-M-C) or not (C-C)), for the latter it is money to play a pivotal role, both as the origin and the end of exchange (M-C-M', M-M').

It is possible to summarize Aristotle's distinction in the following way:

ACTIVITY	GOAL	FORMS OF EXCHANGE
Natural	Reproduction	C-C
Chrematistics	of the oikos	C-M-C
Unnatural	Limitless	M-C-M'
Chrematistics	accumulation	M-M'

The difference between *oikonomia* and unnatural chrematistics finds its origin in the genesis of money, which is an autonomous form of existence of exchange value strictly connected to the social relevance undertaken by trade. According to Aristotle, in its earliest stage trade plays a necessary role for the natural (*kata physin*) reproduction of the whole body politic, but then it ends up endorsing those dynamics that represent a risk for the survival of the *polis* itself.

In fact, while reading these Aristotelian passages, it is impossible not to imagine that specific social background of the fourth Century Athens populated by retailers, merchants, usurers. Aristotle's analysis presupposes this background, but, at the same time, represents it

[17] Aristotle, *Politics*, cit., 1258b, 4-8.

through a specific theoretical framework, whose main feature is the nature of money[18].

The dichotomous nature of money and its dialectics

As we have already seen, in his presentation Aristotle outlines the dichotomy between natural and unnatural chrematistics, and develops a series of further contrasts: quality vs. quantity, use value vs. exchange value, need vs. desire, etc. But all these fixed dichotomies seem to vanish as Aristotle looks at them from the perspective of money.

For Aristotle money has a double nature: it is a useful means and, at the same time, can also be an end. This duplicity represents the condition of possibility of a logical (*kata logon*) passage from natural to unnatural chrematistics:

> When used in this way [i.e. for satisfying natural needs], the art of exchange is not contrary to nature, now in any way a form of the art of acquisition. Exchange simply serves to satisfy natural requirements of sufficiency. None the less it was from exchange, as thus practised, that the art of acquisition developed, in the sort of way we might reasonably [*kata logon*] expect[19].

In this way, from the horizon opened with the introduction of money, the initial dichotomy between natural and unnatural chrematistics results more arguable and problematic. Moreover, it is now possible to see money as the embodiment of the new social relations and practices introduced by retailers, merchants, and usurers: their monetary profit is unnatural (or, as Aristotle sometimes explicitly says, against nature), but it is also a consequent (*kata logon*) development of natural exchange. In this case, it is clear that the logical development does

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[18] As Eric Weil wrote: «Seul le vivant a raison, et c'est nous les vivants. On ne comprenderait Aristote qu'en comprenant son époque. Ce qui gêne, c'st que nous comprenons l'époque d'Aristote surtout par Aristote. Sans lui, l'esprit d'Athènes dans la deuxième moitié du III siècle serait pour nous un X, et quand bien même nous aurions les données nécessaires pour le déterminer, nous ne nous intéresserions à ce problèm» (E. Weil, *L'anthropologie d'Aristote*, «Revue de Métaphysique et de Morale», 51/1946, pp. 7-36, p. 35).

[19] Aristotle, *Politics*, cit., 1257a, 28-31.

not merely reflect the natural (and political) development. Money reflects in itself the ambiguities we have highlighted about trade. The passage of money from means to end happens *kata logon*, i.e. on the basis of possibilities immanent to its notion. For Aristotle a real conceptual difficult hides behind this dichotomy: money gives a quantitative dimension to the exchangeability of products; which is such a dimension that makes two heterogeneous objects commensurable?

This is the critical question posed by Aristotle. According to it, money bears with itself an ontological contradiction reified in the ontological gap that separates quality and quantity. Such a contradiction let us see the impossible and paradoxical logic of economic exchange: money, this Janus-faced thing, is, on the one side, associated with the specific quality of its metallic consistency, but, on the other side, it has the universal capacity to express the value everything[20]. The fact that these contrasts are tangible, but then tend to vanish as soon as Aristotle changes his perspective, raises further problematic issues concerning economic exchange in itself.

Questioning the fundamentals of exchange: Nicomachean Ethics V.5

In order to find an answer (even though a problematic one) to these questions, we have to move to *Nicomachean Ethics V.5*. Here Aristotle, while addressing the fundamentals of exchange, tries to find a dimension that can found the ontological commensurability of the exchanged goods, and thus the justice of exchange; but, according to him, there is not such a dimension. It is exactly what he means when, in conclusion of his analysis, he writes that «it is impossible that things differing to such a degree should become truly commensurable»[21].

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[20] As Scott Meikle writes: «Aristotle is in two minds about money. His official view of its nature is that of a means, but this is a stipulation rather than a conclusion, because he does not argue for it. The view that money is an end is just as integral to his analysis, and his attempt to exclude it as a perversion is inconsistent with his account of the development of exchange where both views of money are integrated» (S. Meikle, *Aristotle on Money*, «*Phronesis*», 39/1994, pp. 26-44, in part. pp. 38-39).

[21] Aristotle, *Nicomachean Ethics*, trans. by R. Crisp, Cambridge University Press, Cambridge 2000, 1133b, 19-20.

In this theoretical context, the possibility of unequal exchange (especially in the form of what economic literature calls profit upon alienation, i.e. buying cheap to sell dearer) becomes real. Historically speaking, this theoretical difficulty sheds a light on an existing and ever increasing contradiction between production and circulation processes in the fourth-Century Athens. Here, the production aimed at producing use values according to the qualities of social needs, while circulation was independent and directed to a limitless accumulation of exchange values.

From this standpoint, Aristotle is a shrewd interpreter of his epoch: on the one hand, he underlines the conceptual categories to frame the essential conditions of reproduction of the *polis*; on the other, he faces, more or less consciously, the factors of the crisis of fourth-Century Athens.

Anyway, in this context it is also possible to highlight some aspects that unveil the modern relevance of the Aristotelian investigation.

Conclusion: Aristotle beyond Aristotle

After having differentiated use and exchange value in *Politics*, in *Nicomachean Ethics* Aristotle look for that specific *quid* that could ground the commensurability of two heterogeneous articles and, hence, the conditions of possibility of exchange itself. The classical and neo-classical economic thought has never taken into consideration such a problem[22]. Classical and neo-classical economy have never felt the theoretical need of an earlier and common substance beyond use and exchange value[23]. For these currents the why of economic exchange is solved with a simple empiricist tautology: exchange happens because

[22] Michael Heinrich ha stated that this void is a manifestation of the empiricism, anthropological essentialism, and naturalizing historicism, that characterizes the theoretical field of classical and neo-classical economic thought. See: M. Heinrich, *Die Wissenschaft vom Wert. Die Marxsche Kritik der politischen Ökonome zwischen wissenschaftlicher Revolution und klassischer Tradition*, Westfälischee Dampfboot, Münster 2014.

[23] See: S. Meikle, *Quality and quantity in Economics: The Metaphysical construction of the Economic Realm*, «New Literary History», 31/2000, pp. 247-268.

it happens. For them, commensurability is not a problem at all. Aristotle, instead, tries to unravel the essentials of exchange when he asks himself the crucial questions: «Why there's commensurability? Why two articles should be commensurable?». Questions like these help us understanding why Aristotelian reflections, with their critical and philosophical attitude, are still relevant to us today.

In a crucial point of *Capital,* Volume One, Karl Marx writes: «Aristotle's genius is displayed precisely by his discovery of a relation of equality in the value-expression of commodities»[24]. According to Marx, this discovery has been ignored for much long time. In my opinion, this example should be a fruitful input for trying to discover in Aristotle's socio-economic inquiries unanswered questions that could still teach us something today, well beyond those interpretations that want to see in them only a moralistic defence of archaic and aristocratic Athenian ideology[25].

Following the Marxian approach[26], we shall acknowledge that sometimes Aristotle can't solve the problems he poses because he

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[24] K. Marx, *Capital. A critique of political economy. Volume One*, trans. by B. Fowkes, Penguin, Harmondsworth 1976, p. 152. Aristotle is a pivotal inspiration for Marx's elaboration of his critique of political economy, especially from 1859 onwards. Marx was the first author, who, while dealing with the questions posed by modern economic thought, highlighted the importance and originality of Aristotle's economic writings (*Politics, I, 8-10* and *Nicomachean Ethics, V, 5-8*). See, among the others, the following papers by G. Lotito: *Aristotele su moneta, scambio, bisogni*, «Materiali e discussioni per l'analisi dei testi classici», 4/1980, pp. 125-180; *Aristotele su moneta, scambio, bisogni*, «Materiali e discussioni per l'analisi dei testi classici», 5/1980, pp. 27-85; *Aristotele su moneta, scambio, bisogni*, «Materiali e discussioni per l'analisi dei testi classici», 6/1981, pp. 9-69.

[25] Among the others, see: E. Will, *De l'aspecte éthique des origines grecques de la monnaie*, «Revue Historique», 212/1054, pp. 209-231; K. Polanyi, *Aristotle discovers the economy*, in K. Polanyi, C. M. Arensberg, A. Pearson, *Trade and market in the early empires: economies in history and theory*, The Free Press, Glencoe, pp. 64-97; M. I. Finley, *Aristotle and economic analysis*, cit.

[26] A well-known example of this hermeneutical approach is the following passage: «Aristotle [...] himself tells us what prevented any further analysis: the lack of a concept of value. What is the homogeneous element, i.e. the common substance, which the house represents from the point of view of the bed, in the value expression for the bed? Such a thing, in truth, cannot exist, says Aristotle. But why not? Towards the bed, the house represents something equal, in so far as it represents

lacks the adequate theoretical field to develop the problematic he has previously defined[27]. From this perspective we could face the Aristotelian problematics within the theoretical field opened by contemporary critical theory – last but not least, for example, a crucial question of our times: the socially mediated (and hence, historically determined) ways to satisfy, produce, and reproduce natural needs[28].

Problems are often defined not by their apparent extent, but by their specific weight. This is also the case of the Aristotelian problematic we have examined in this paper: the dichotomy between natural and unnatural chrematistics. A problematic that can find its solution not only through a reading of Aristotle *with* Aristotle, but also of Aristotle *beyond* Aristotle.

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what is really equal, both in the bed and the house. And that is – human labour. However, Aristotle himself was unable to extract this fact, that, in the form of commodity-values, all labour is expressed as equal and therefore as labour of equal quality, by inspection from the form of value, because Greek society was founded on the labour of slaves, hence has as its natural basis the inequality of men and of their labour-powers» (K. Marx, *Capital...*, cit., pp. 151-152).

[27] For this epistemological dialectics between problematic and theoretical field see: M. Heinrich, *Die Wissenschaft vom Wert...*, cit., pp. 19-26.

[28] «The thing that is said to be nature in the primary and full way is the substance of things that have a starting-point of movement within themselves, insofar as they are themselves. For the matter is said to be nature because it is receptive of this, and comings to be and growing because they are movements arising from it. The starting-point of change for the beings that are by nature, which is in some way a component of them, either potentially or actually, is also this» (Aristotle, *Metaphysics*, trans. by C. D. C. Reeve, Hackett Publishing Company, Indianapolis, 1015b, 14-18). So, if human beings are social animals by nature, and if the *polis* is the perfect community by nature because it enables humans to satisfy their needs in the most perfect way, then setting the boundaries of the natural is not so easy as Aristotle suggests in *Politics*. And, as a matter of fact, Aristotle himself seems to force us to consider the socially mediated (and potentially infinite) ways to satisfy human natural needs. In this sense, the loss of immediacy deepens the Aristotelian configuration of the limits immanent to naturally conditioned social practices. «Far from being the sign of an inherent finitude of the human being, the loss of immediacy at the centre of its being is rather a sign of its *infinity* in the sense that it enables humans to socially mediate their relation to the rest of nature in an infinite numbers of ways» (S. Mau, *Mute Compulsion: A Marxist Theory of the Economic Power of Capital*, Verso, London – New York 2023, p. 103).

What moral order?
Man and Society in Genovesi's ethics

Antonio Scoppettuolo

Individual and society

Yet unlike many of his contemporaries (and later modern philosophers), Genovesi did not reject the natural law tradition in ethics and civil society in favour of the emergent modern view of the individual human being as a being that is dictated by individual interests and of society as the outcome of a social contract regulating competing individual interests. He sought, rather, to bring together the humanist ideas of the Italian enlightenment with radical Christian metaphysics and the natural law tradition in philosophy in his proposals for social and political reform in the Kingdom of Naples. Genovesi was not only a priest, moral philosopher and economist but also a reformer of civic society.

According to Genovesi, two different paths of reflection had arisen and opened up among his contemporaries on the question of the relation of the individual to society in moral theory: first, there was a modern enlightenment one that stressed the opposition between individuals and society, between the particular and the universal, and appealed to some form of social contract theory of competing individual interests as the explanation and justification for the existence of a regulated society. Secondly, there was a more, traditional classical Aristotelian idea that viewed human beings as social beings by nature who, by working together with others in society pursuing the common good, improve the good of individuals themselves. In this traditional account, part of what it is to be an individual human being is to have a stable human nature and a social dimension. Furthermore, from a Judeo-Christian point of view, that human being is made for God and the perfection of that being's nature. All of that beings' actions, the

actions of human beings, therefore, should be directed towards the last end, to God, who created the universe and who is provident of all of this. In this Aristotelian-Thomistic scheme of things, it is the natural sociability of human beings that necessitates both the regulation and supervision of state-civil law as part of the fulfilment of this plan, but the nature of such states is not pre-determined. States, rather, are of different kinds and evolve over time and in time throughout history (as Vico had argued). The state, nonetheless, exists as a product of moral evaluation of the common good of society for all individuals. Far from being antagonistic to historico-socio-political developments or individual interests, therefore, natural law theory of morality is compatible with the regulation of the state as a natural society, whatever form that state takes; or, at least, so Genovesi argues around the time of the unification of Italy and before the establishment of Modern Italy as a nation-state.

Genovesi notes that in modern social contract theory, the person is viewed as an autonomous agent who pursues that being's own interests against the interests of the others. In this view, some regulation by the state of those interests that is both limiting and limited to all within that particular society is necessary in order to have the prospect of both individual and social life. The other traditional Aristotelian approach emphasizes the idea that individuals in society co-operate with others because, by pursuing the common good, those individuals also build their own individual good. According to Genovesi, this traditional position is not necessarily antagonistic to the modern enlightenment position in many respects. In fact, he argues that in both cases what makes the moral person act is not the guarantee of that individual's own existence in society and the sharing of the existential human condition — for if one does not exist, one can do nothing — but the personal benefit from living in society for one's own existence that is orientated towards the common good, just as Aquinas and Aristotle had argued. Benefit is profit, and so, searching for one's own good profits society.

Genovesi, then, was well aware of the value that the utilitarian perspective placed on the individual and society where society is devoted to the social benefits and interests of human beings (and not to the interests and benefits of the few over the many). His unique contri-

bution in his elaboration of the natural law tradition in morality and society, however, was to argue that human interests include and extend to both the good of the individual and the common good of society. Consequently, Genovesi develops a more complex ethical and social reflection on the individual and society than either modern social contract theories or traditional natural law accounts of the individual and society could provide. To do this successfully, however, Genovesi has to reject the philosophical anthropology underpinning modern social contract theory and revitalize two traditional notions of the human being as a being that, by nature, desires to know (Aristotle) and that, by nature, desires to be happy (Augustine) and lives in a society, freely in pursuit of eternal truth and the attainment of complete fulfilment as a human being with God in the next life.

Augustinian Anthropology

Genovesi appreciates, very much so, the contribution of utilitarian ethical theory to the philosophy of the state (his research influenced Adam Smith), but he overcomes utilitarianism thanks to a defence of a social philosophy from which a person's moral, social and spiritual complexity emerges more and more. For our author the individual's moral life is founded on the pursuit of virtue. Virtues have as their counterpart *cupidity*, which acts like a *spring* that gets longer and shorter. The human being, therefore, achieves his task in society and in spiritual life on the basis of the variable use of *cupidity*. In fact, Genovesi writes: «The state [of our soul], which we must search for, is the one in which our happiness is less subject to disquietude and restlessness, and which returns the most to the security of our state [our human condition], and that unlocks a fruitful source of permanent and pure joy. The state [of the human soul] that contains all these advantages is the state of virtue»[1]. The state of any human soul that does not contain all of these advantages, therefore, is a state not only lacking in virtues (of prudence and temperance) for the individual but also one in which our social happiness is more subject to disquietude

[1] A. Genovesi, *Elementi di filosofia morale*, libro II, sez. II, *f*. XXIII, p. 138.

and restlessness resulting is a more insecure social environment and thus a hindrance to the flourishing of both the society and the individual as such. In order to appreciate Genovesi's position, therefore, it is of importance to begin with his Augustinian view of the human being as a being that naturally desires happiness.

Genovesi does not deny the validity of *cupiditas* (desire) as a natural element in the relationship with goods and riches. On the contrary, he draws our attention to this. In the First chapter of the First Book of his *Diceosina, o sia della filosofia del giusto e dell'onesto* (1766), Genovesi writes that «every man is inclined, by nature, to love his own existence, and to follow that state of being, in which he is very comfortable and satisfied»[2]. In this starting point, Genovesi begins with Augustine's famous discovery that, on reflection about his own existence, as a matter of fact, he, as a human being, and so, by extension, all human beings, want to be happy. All human beings, by nature, desire happiness. Thus Genovesi would like to stress the point that *to be* happy is the natural orientation of each and every one of us as human beings. He also, however, indicates, as Augustine did before him, the dangers and risks to which *cupidity* may lead. Wanting to be happy is not the problem, but what we want may well be. This is why Augustine argues in *The Happy Life*, alluding to Cicero's *Hortensius*, that «to wish for what is not fitting is the worst kind of misery. It is not quite so misfortunate not to attain what you wish as to wish to acquire what you ought not». Thus it follows that «no one can be happy who does not have what he wants, and that not everyone who necessarily has what he wants is happy»[3]. Obtaining what is not fit to wish for, then, cannot make anyone *happier* because its attainment does not make one happy *in the first place*. The only time that we will be guaranteed that true happiness will obtain is when the truth of that happiness is eternal. This is why our human condition desires not only happiness in this life but eternal happiness. This condition, howev-

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[2] Id., *Della Dioceosina o sia della filosofia del giusto e dell'onesto*, a cura di N. Guasti, Centro di Studi sull'Illuminismo europeo "G. Stiffoni", Ed. della Laguna, Mariano del Friuli 2008, p. 19.

[3] Saint Augustine, *The Happy Life*, in *Ancient Wisdom for Modern Mind*s, trans. by M.S. Russo, SophiaOmni Press, New York 2011, p. 303.

er, is only obtainable for each any one of us with the existence of God and immortality in the next life. As Augustine famously put it, «restless is the heart until it rests in the Lord». Yet this condition of fundamental unrest requires in this life, as an existential task, to search for a possible unifying principle that leads both to the proper private good and the proper public good commensurate with human happiness at the same time. This is fundamental to Genovesi's reflection, but this is not founded on a view of human nature withdrawn into itself and devoted to its own benefit and to the mixture of pleasure and pain, as Hobbes and utilitarian social contract theorists would have it. It is, rather, based upon the social needs of a human being in pursuit of the common goal of happiness in relation to others for that being's individual happiness. In this respect, Genovesi expands the moral paradigm underpinning utilitarian ethics to include the consideration of the natural sociability of human beings as part of the range of the characteristics of that being's desire for happiness.

Individuality, in Genovesi's thought, certainly continues to maintain its importance stressed in utilitarian ethical theory, but its nature is understood in a completely different fashion because satisfying the needs of others is an intrinsic part of its needs and its own happiness. The change of the paradigm of individuality model still makes the individual be the centre of the aggregated life, but the individual's pursuit of happiness is not only private as it must also meet the public one. In this respect, the pursuit of happiness is a shared concept in the sense that it belongs both to the single individual and to the society of which that individual is a member in the same way. Public happiness, then, can be increased, but not as an arithmetical sum of personal benefits in a collection of aggregated facts, but thanks to the individual's sociability and capacity for moral (social) growth. Work can and should perfect a human being. To act humanly is to act purposively, to do something in order to do something else, to set about to achieve what you know and want. Work and industry, then, must be purposive and arrange its purposes hierarchically in the sense of stemming from an evaluation of the common goal through co-operative work on existing resources and property that is not to the detriment of any individual as a human being, whether that individual human being be the employer as manager or the employee as labourer.

In his reflections on the individual and society, therefore, Genovesi, as Galanti points out, has come to and approaches «those disciplines that help preserve man, and make his life less unhappy»[4].

The paradigm of rationality that Genovesi advocates is not that of classic utilitarianism. Reason is not a sponge that absorbs resources and transforms them into gain; its purpose is not to increase pleasure, but to lead man to what is *right*, *useful* and *true for the individual and society* through a process of reflection. It is in reason, and starting from it, that the line between morality, nature, freedom and law is fixed. Although man does not possess the necessary strength to comprehend the secrets of nature, he has *enough strength*, Genovesi remarks, *to feel its effects and order*[5]. What order, however, is Genovesi talking about here? The order that he means includes the one for which we have responsibility, that is, the moral order that we bring about through our free acts. The order that concerns Genovesi, then, extends to and includes the ethical and political life of *both* individuals *and* society in addition to the natural order of nature upon which man depends and works and has to work in order to earn a living, invigorate and expand society. For Genovesi, society is thus more than a collection of human beings, it is a community of human beings that includes working with nature as part and parcel of our human nature and destiny.

According to Genovesi, the use of reason represents the possibility of individuals accessing the possibility of a social life in line with norms: «Reason is nothing other than the calculating faculty: but to well calculate it needs certain evident and fixed principles, without which it will never be upright»[6]. Using reason in line with ethical principles will, above all, leads to happiness; the goal is to lead an individual along the path of virtue, even before preserving the existence and continued existence of the social body. Genovesi raises and answers the question: «But what should a rule be that could well help us conduct ourselves in the course of our life, so that by holding on

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[4] G.M. Galanti, *Elogio storico del Signor Abate Antonio Genovesi*, Firenze presso Francesco Pisoni 1781, p. 65.

[5] A. Genovesi, *Della Diceosina*, cit., p. 46.

[6] Ivi, pp. 33-34.

to that, we could march straight and sure toward our happiness? I believe it should have all the following conditions, that is, it should be true, upright, indisputable, immutable and divine, obligatory»[7]. Thus the moral dynamics within the communal life requires individual practice of prudence because the same communal life depends on laws oriented towards moral principles to which every human being and the pacts that that human being makes with his fellow human being, depends.

Mutual Assistance

The happiness of the social body depends, therefore, on the happiness of the individual. But what is their relationship? Certainly, it is a relationship built on the balance between private virtues and social body virtues. In *Elementi di Filosofia morale* (1770) Genovesi states that the human being who acts in a moral fashion keeps passions and cupidity within the private sphere. Passions and individual imbalances undermine harmony in society and transform it into an arena of conflict. By comparison, happiness, which can be pursued through a path of individual moral development, becomes the bond that ensures progress and conservation of the social body. Personal virtues generate public virtues, among which the greatest one is that of justice. The venerable institution of justice originates in the subjective moral sphere and then takes a public form. In fact, justice, even before being realized at the formal level of institutions, belongs to the way one lives his and her own life and to the relationship established with others. The pursuit of private good in a selfish sense contradicts the very nature of man that is neither evil nor savage but relational with others, just as Aristotle would have it, that is to say, man, by nature, is a social being (*zoon echon politikon*).

Individuals, as foundation of the community, and their civil improvement generate the improvement of the whole body. They do not abstractly ask for the execution of justice, but generate it through their own subjective behaviour. According to Genovesi, the social contract, in this sense, is not generated out of the stratagem of fear, nor by the

[7] Ibid.

threat of the foulness innate in everyone: what leads to the civil union is the recognition of the innate weakness and of the interdependence between human beings. The latter is the base that establishes the building of its original contractual version. Fragility has, above all, an ontological nature; it is part of the natural metaphysical nature of finitude and our mortal state. The remedy to fragility can be found, on the one hand, in the family and, on the other, in the union of several families through a covenant, that is, state law[8]. The purpose of state law is certainly there to restrain instincts that are non-conducive to commodious living, but more positively it also contains the guarantee that moral and natural needs can be satisfied for individuals. The covenant is a subsequent and consequent bond deriving from the *law of nature as* founded on human sociability. In this regard, Genovesi re-iterates the adage 'the state is a natural society'; it extends and strengthens natural (moral) law of justice by defining its outlines through what Genovesi calls *general law* (*state positive law*). *The invasion of the strongest* or *the bad habit of the many* has a detrimental effect on the fragility of the individual who finds his and her own shelter in the natural tendency to sociability. Both instincts, that of sociability and that which takes shape in the immoderate instincts that produces injustice, are part of human nature. It is the balance between the two instincts and the discipline of the passions through the virtue of prudence that paves the path to happiness. Thus, a social contract that establishes the state is necessary for both individual as such and society as such to exist at all.

In short, Genovesi's version of 'contractualism' is modeled on human being's moral needs: these needs are both individual and social but the first need is that of sociality which represents the code to understand individual's character and properties. Cohesion becomes a fulfilment of providence (natural and divine) that draws the path to happiness, making strong what is weak. Passions, according to a universal project, are mediated by providence which helps individual pursuit of happiness harmonize with the public one. Yet to say God is provident, means God is outside of time whereas human state law must be in time. Thus human written state law will need to take into

[8] Ivi, *f*. XII, libro II.

considerations the conditions under which it operates and to change to improve the condition and lot of human individuals.

If moral life is realized in the individual, the social one needs everyone because happiness pursued at individual level produces public happiness. The ruin of the individual generates the ruin of the whole body. Genovesi's lesson reinterprets the contractualism and introduces the element of mutual assistance as a moral code of man's ontological condition. Such a moral code, however, undoubtedly calls into question any arbitrariness in the power exercised by the State over individuals because just as man's frailty and physical senility can be faced thanks to reciprocity among individuals, this, according to Genovesi, is a natural right equal to property and other primordial rights. «Among the rights of our nature, we want to put not only that one regarding the security of our properties, which is called *perfect law*, but also that right of the man to be rescued by another man when in need, that mutual aid, which is called *imperfect right*, because it seems that we cannot force others to lend it to us»[9].

This right is founded on three properties of human nature: the first consists in the mutual need to overcome natural weakness; the second is based on *attracting energy motions* that make human beings attracted to their fellow human beings by friendship, love, mercy and sociability; the third consists in true usefulness. According to Genovesi, violating these rights and properties is equivalent to opposing human nature itself. The character of this variation of Genovesi's version of utilitarianism, therefore, must be understood within the dynamics of reciprocity, based on the principle of inter-dependency and respect. The famous principle *preserve each one's rights* indicates this perspective. In fact, Genovesi writes,

> All mankind naturally rejects mean, arid, cold, cruel souls by its nature. The only difference, which can be placed between *perfect and rescue rights*, is that when we require the first there is no action, and we require the latter there is action; and every man can always not do what is harmful to others, but not always and to everyone can do what benefits; the obligation to keep the prizes is infinite, but the second one cannot be[10].

[9] Ivi, p. 47.
[10] Ibid.

Natural rights, therefore, are prior to civil laws, which can but do not necessarily produce morally acceptable social order. The construction of the civil law integrates the natural one and for this reason it is connected to the moral, so that the violation of each one's rights produces resentment, revenge and *anger against the civil body* while «The observance of rights and duties, and the practice of virtue brings health and tranquillity of nature, and love, and benefit to the other men. And these are innate pains, and recompenses, connected to nature [and natural justice]»[11]. Unlike Hobbes, who had delegated the responsibility to restrain man's instincts to the external authority and to the force of the law, Genovesi seeks to discover in the individual's nature the good element both to cultivate and to refine through moral practice. For Genovesi, law can help to contribute to human elevation but it cannot completely replace individual moral life. Society, nonetheless, is not the product of a pact between adversaries or private interests, but between individuals that need mutual aid and who are naturally oriented to sociability. Mutual aid acts and operates on various levels, that is, between individuals (against other men's [external] violence) and between men and nature.

According to one commentator, the area where Genovesi sees such an opportunity to exercise reciprocity is that of the market. In fact, Bruni argues that economy is an area where Genovesi saw the greatest imbalances and injustices among men[12]. Genovesi interprets the network of relationships established from trade as the best expression of cooperation between counterparts.

Zamagni and Bruni remarks: Genovesi renews the classical vision of the Aristotelian economy. There is no separation between home and public affairs: «The common trait indicates a radical change in the new economy compared to the Aristotelian and ancient economy, where the law of the *oikos* (home) ended, therefore the *oikos-nomos*, laws of *polis,* politics; the first founded on blood ties and hierarchy and the second on *philia* between equals»[13].

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[11] Ivi, p. 48.

[12] Cfr. S. Zamagni, L. Bruni, *Introduzione*, in *Lezioni di economia civile*, Vita e pensiero, Milano 2013, pp. VIII-XXIV.

[13] Ivi, p. XVIII.

Now, public happiness and private happiness, therefore, are not mutually exclusive or mutually antagonistic because they can be pursued through [private and public] virtue.

Genovesi writes: «Ethical happiness is that of a private person; economic happiness is that of families; political or civil happiness is that of the republic [state]. A man whose sum or intensity of the pleasant points of all his life far exceeds that of unpleasant points will achieve natural happiness and this will be called *monastic* or happiness of a [one] person. The family in which there is unity, harmony and friendship of its members will join the monastic happiness of all, this will be a happy family; and blessed it will be said of that republic in which families it consists which will be harmoniously joined both together and with the head and will all enjoy economic and monastic happiness»[14]. It is quite clear, then, that Genovesi is using an analogous concept of 'the family', the state is not literally a real natural family as the product of natural human procreation but the product of providing structures and regulations that lead to the flourishing of all individuals in their families *like a well-functioning natural family*, within the given society under its jurisdiction. In reality, the state has to regulate between families, settling conflicting claims, provide necessary supervision of human activity that may lead to the disintegration of society, distribute resources and so forth – these are not and cannot be a matter for natural families themselves, but for the state.

The two types of happiness, personal-familial and state-social-familial, nonetheless, are neither in contradiction nor ethically distinct, but belong to a single analogous logical-moral progression of human sociability and moral advancement. In sum, private happiness is not predatory and does not arise in opposition to the public one.

Universal and particular

For Genovesi, the social body originates from mutual necessity to life and conservation. Thus the meaning and practice of virtue cannot remain a problem solely of private happiness, but must contribute to

[14] A. Genovesi, *La logica per gli giovanetti*, cap. VIII, *f* VIII.

the public happiness by establishing justice. This does not contradict the individual character of moral practice, it rather strengthens it. In this, however, Genovesi disagreed with Antonio Muratori's argument in *Pubblica felicità*[15] that public happiness was not born from the sum of the individual virtues, but from the practice of justice carried out by the political elect. The task of ensuring common happiness is not entrusted to individual progress but to the progress of some enlightened men. For Genovesi, on the contrary, the practice of virtue must and can be communal and scattered among all social classes starting from the simplest ones[16]. His reforming project cannot be realized without the moral elevation of the population. His doctrine is thus not a political one, a doctrine of classes and institutions, but above all a moral doctrine that finds application in reality. After all, the Enlightenment age is distinguished from the other ages precisely because of the attention by philosophical speculation to contingent reality and the application of doctrines to social reforms. The practice of virtue, achievable through the moderation of vice, the discipline of passions and the education to arts are all part of a philosophical-pedagogical program that views man as leaving his state of basic animality, in relation to any political-social issue, to restore human happiness. The latter represents a public goal to the extent that it is pursued through social harmony. In this sense, even the controversy with Rousseau had strengthened

> in Genovesi the conviction that culture constituted the indispensable instrument to give communal life a harmonic and lasting structure, as far as possible. Consequently, the contribution by the arts and sciences became necessary for the creation of a new balanced political system which, in redistributing lands and wealth, was careful not to produce new social inequalities and to gradually reduce disparities between rich and poor, until the conflict between individual and social class interests on the one hand, and the entire community's interests on the other, was suppressed[17].

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[15] L.A. Muratori, *Della pubblica felicità* [1749], Donzelli Editore, Roma 1996.

[16] Cfr. C. Passetti, *Una fragile armonia: felicità e sapere nel pensiero di Antonio Genovesi*, in *Felicità pubblica, felicità privata nel Settecento*, Edizioni di Storia e Letteratura, Roma 2012.

[17] Ivi, p. 867.

The relationship between private and public happiness is a necessary relationship, that is to say, distinct yet inseparable. Between the two there is a dependency bond because one does not exist without the other. This is clearly emphasized in *Lezioni*:

> A civil body cannot be either stable or happy, when its parts do not feel sure of their rights and of that part of natural happiness, which nature and their efforts grant. To this end a superior force is necessary, which represses the not-right desire, that could arise in some, to disturb the rights of the others, and defends the whole body against the insults of the other political bodies around it[18].

First of all, it is clear that the civil body has the task of ensuring *natural happiness* whose yearning as an essential right is already inherent in human nature; therefore, the civil body does not act *a posteriori*, it does not have the task of building up the conditions of happiness *ex post*, but of recognizing, by means of the certain laws of the Public Code, a reality that the individuals already establish through their own conduct by means of a process of scattered morality. The civil bodies, as Genovesi maintains, consist of people endowed with all the instincts and affections, passions and viciousness, and for this reason their task is to correct negative passions, while pursuing the moral raising of each member[19]. Men are not naturally at war against each other but, as a matter of fact, they go to war because of the drifting of their instincts. Genovesi writes: «Hobbes is wrong when he says that men are in a state of war by nature. If he said *de facto* he would be right»[20]. For Genovesi, there are two rights and two obligations at the same time: one is the right to seek and realize private happiness, which answers a right-obligation inherent in human nature, and the other one is to pursue common prosperity, which is included among the agreements establishing a community.

Therefore, rights are dependent on positive law and, at the same time, law would have no reason to be without rights. The great modernity of Genovesi, then, lies in the fact that he does not hold the

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[18] Ibid.
[19] Ibid.
[20] Ivi, p. 30.

view that the purpose of the state is to ensure the existence of an individual's life and safety in face of an existent tyrant's arbitrary act or the counterpart's retaliatory blind violence, but of guaranteeing man's very own properties; for this reason the science of rights is the moral science par excellence whose purpose is human happiness[21].

The state of necessity and fragility of which man bears the pain does not contradict the natural tendency to sociability; actually, it is by its virtue that individuals form families, communities and States. Compared to other living beings, human beings are endowed with a more sublime feeling that is rooted in the human heart (a metaphor for social conscience) and human nature: this natural instinct is pity which, when it is not corrupted by passions, wrong education, or from the intellectually and socially destructive *spiritual belief* by some in a society of their moral superiority over other fellow human beings, therein overturning the concept of natural equality and interdependency among each and any human being in society, represents the peculiarity of *human* association. Humanity, in other words, is really a moral concept, a moral ideal to strive for, not a biological fact of being a group or species of living animals on earth. It is founded on social conscience and moral needs, not biological drives and instincts.

Moral sentiments and virtues

In light of his moral concerns for society and individual human beings, it is not surprising to find in Genovesi's *Logica per gli Giovanetti* (1776) that, for Genovesi, the analysis of human feelings represents the core for understanding moral sciences. Ethical life is realized within man's heart, that is to say, that being's moral conscience, emotional reasoning. Two opposing forces act here, one pushing human behaviour in one direction, then another in a different direction. One is a *concentric* force and the other a *diffusive* or *expansive* force. The *concentric* force is focused on self-love; the *diffusive* one, by comparison, pushes to realize the social good and right.

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[21] Cfr. V. Ferrone, *Storia dei diritti dell'uomo*, Laterza, Bari 2014.

> The *concentric* force alone detaches man from the species and isolates him, while man is a [social] animal, which cannot live alone. The diffusive force alone detaches man from himself and annihilates him. How many sacrifice themselves for their children, for their friends, for their country? How many sacrifice themselves for mercy of some poor wretches, for love? Therefore, man's happiness lies in the harmony between those two forces[22].

Genovesi's main criticism of Hobbes and classical contractualism is that this theory originates from a political focus on the *concentric* force in a human being without having analysed the properties and functions of *moral* feelings. Hobbes has chosen the *concentric* force to justify a state of nature in which everyone looks at the other one as a creature to be killed; here, Hobbes has resorted to an affirmation of the *diffusive* force not because he recognizes the individuals' natural sociability, but because he bases his arguments solely on the fear that man can experience in front of his own counterparts and his own demise, the fear of one's own death. In this sense, attention to the other becomes only a utilitarian concession. «A system false in nature and evil in practice... Because love for one's own happiness is a concentric force, it does not have its whole range without love of the species»[23]. To avoid an excessively individualistic reading of Genovesi's anthropological vision, then, it may be useful to clarify the value of the *concentric* force.

For Genovesi, *concentric* force represents the dynamics in humans that produces self-love and motivation to take care of themselves, their own survival and own happiness. If a human being, however, is solely motivated by private interest, this, Genovesi remarks, will convert that human being's life into a chain of unhappiness – precisely because the human being is naturally inclined to sociability – thus depriving that individual being of the opportunity to be receptive to the environment around that being, that is, the social world. Openness to species, given by *diffusive or expansive* force, represents a necessity of the individual who *does not stem from the earth as a fungus*, producing modifications of the primitive law of nature dealing with the survival of the self; the modification in humans is rather a conse-

[22] A. Genovesi, *La logica per gli Giovanetti*, p. 227.
[23] Ivi, p. 228.

quence *of various human beings' unions*[24]. Love for *species* extends to and includes one's own fellow human beings without excluding oneself and one's own realization. For Genovesi, separating the individual dimension from the social one, that is, separating private interest from the pursuit of virtue and honesty, means, on the one hand, contradicting nature, and, on the other, contradicting the same interest of each member of this relationship. In *Diceosina* he writes: «If Justice is to preserve God's rights, our rights and those of the others, it is also an honest and true moral virtue. And it this balance of the law between concentric and expansive force, and only this balance that can make our present a state of happiness, it alone [this balance] is in our true benefit and our true interest»[25].

The purpose of moral philosophy is to regulate human behaviour whilst denying the primordial forces that stir and direct the human being and human societies to self-destruction. The first rule of happiness and laws is founded on nature itself, thus: «If the nature of things; if the human being; if human beings' relationships; if the civil body and its relations; if the interest of man and of the Republic and so forth, are not the foundation of laws, laws come into a conflict with the physical part and do not last, or are in endless ways deceived»[26].

The order of morality and that of law therefore rest on the order of essences and cannot deviate from it. Happiness is not the preserve of rulers only or of some enlightened princes, it does not reach men through the fatherly benevolence of the sovereign. It is rather everyone's right of divine origin that falls within that ordered general plan in which individual and social body are included. Every man naturally loves his own existence, «Human happiness lies here. Everyone craves it as long as he believes he must live; no one is so stupid or crazy as to tell you truly that he seeks happiness not for all his life long but only for a part of it»[27]. However, the civil body and what supports it, that is, the feeling of sociability, has in *law* the capability to produce moral notions itself and therefore, to cause good in the members. General

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[24] A. Genovesi, *Della Diceosina*, cit., p. 323.
[25] Ivi, p. 52.
[26] Ivi, p. 233.
[27] Ivi, p. 19.

morality produces in the individual a capability to generate the right solicitations; at the same time, it is precisely in virtue of the practice of justice by the single participant that moral life enriches those who are initially excluded from it. It is a group effect that only much later social research would have coded, for example, with Weber and the methodological individualism.

The cruelty of man towards his fellow man, nonetheless, according to Genovesi, is not given by natural wickedness, but by his miseries, that is, by his needs. Such needs can be satisfied within the social body, but also denied and when it happens it is *because of the weakness of certain governments, or it is the corruption of the governors that increases these evils, and increases wickedness*[28]. Thus, Genovesi remarks, rules and regulation of social behaviour by Governments, then, are conceived with virtues and vices which, in the same way, become internalized by individuals in society. Thus, the contents of the law represent the external rule of reason on the basis of which passions may increase against someone or return to the harmony of law and sociality: «Stupidity, luxury, greed, crimes of one family enrich the other one that will be wise, prudent, moderate, abstinent, right, human, kind: and wisdom and virtue of this family will obtain the punishment over the slothful or bad one. In no part of the World this can be seen more clearly than in the entire political bodies»[29]. Rules and individual morality, which is structured also by means of external laws and, at the same time, helps create them according to a common sharing of the concept of nature, gradually intersect. Genovesi's Enlightenment reformism places, therefore, as basis the creation of a science of happiness to be realized starting from individual's different levels of expression and sense of belonging. One of these levels is the political one, within which Law and Governments, as Genovesi explains in *Lezioni*, firstly must guarantee tranquillity and preservation of the society, and secondly must assure *comfort* and welfare, and thirdly promote *natural and civil happiness*[30].

The efficacy of the *empire* contributes to the achievement of the individual's happiness *insofar* as it supervises and above all represses the *un-*

[28] Ivi, p. 135.
[29] Ivi, p. 48.
[30] Id., *Lezioni di economia civile*, cit., p. 28.

fair cupidity that could trouble the rights of the others. For Genovesi the satisfaction of desire is included in the range of possibilities man is given by nature. This is why for Genovesi, following Locke, bad and unjust Governments were also included in the list of evils and pains man could come across but ought not to[31]. Thus Genovesi places this form of evil as a *lesser of evils* by comparison to the golden rule of the satisfaction of existence, a rule that is explained through the practice of morality, assisted by good law: «Therefore, beatitude we can be given here [in actually regulated society] is having the least possible pain [over the alternative of most possible pain], both in body and in heart: MINIMUM PAIN and HOPE for the best, admirable nurturer of everyone who thinks»[32]. Thus Genovesi raises the rhetorical question «Where does prosperity and happiness of a republic derive from? [and he answers] Put together those magnanimous cares of the sovereigns, those of the magnates, these of the gentlemen, of the scholars, of the ministers of religion, the well-regulated labour of the people, and be sure that you will have a flourishing, prosperous and blessed State»[33].

Thus, the social order reflects the moral one and the moral order reflects the gradual progress towards virtue, which is the engine that drives man to the pursuit of superior goods. This does not mean disdain for the basic goods, since for Genovesi all goods that lead to happiness, understood as physical and spiritual well-being, are primordial rights. The reformist plan of society has in moral progression a mirror where the State external goods coincide with the individual's internal ones. For this reason, avoiding the restlessness of the passions means eliminating the contradictions produced by poverty and need also in the relational dimension, while «The state we must look for is that where our happiness is less subject to restlessness and anxiety, and that returns as much as possible to the security of our state, and that opens a fruitful source of permanent and pure joy»[34].

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[31] J. Locke, *An Essay Concerning Human Understanding,* libro II, par. 43; ed. It., *Saggio sull'intelletto umano*, Bompiani, Milano 2004.

[32] A. Genovesi, *Della Diceosina*, cit., p. 20.

[33] Id., *Lezioni di economia civile*, cit., p. 48.

[34] Id., *Elementi di filosofia morale*, cit., libro II, sez. II, *f*. XXIII, p. 138.

In light of these observations, it is clear that there is a very close correlation between moral progress and social progress. Individual's happiness does not improve and does not increase in opposition to the public one because just social structures enable individual flourishment, and so, personal freedom is more protected within such social-political structures. Mismanagement of social institutions are bad for both individuals and society. It is precisely because the state is subject to moral evaluation of the common good that both the politics and economics of the day is ultimately a matter of morality and moral practice upon which the relationship between man and his material goods depends.

In this sense, even for Genovesi there is no mechanism of general compensation as it is in Smith ('the invisible hand') according to whom selfish interest, in the end, is good for general interest. The solution to market contradictions, which always derive from primarily individual attitude, is not entrusted to impersonal mechanisms. The perspective of Genovesi, one who had been involved in civil economy for a long time, is not that of the economist but of the moral philosopher. This is normal at that time. Here, however, we have the reversal of Smith's pyramid: from the individual's moral improvement, according to the conditions we have seen before, the general good also derives. That is, the individual is invested with an initial responsibility towards others as well as himself.

Let us now answer the initial question: Is an ethical order possible in society? And what it is based on?

For Genovesi it is in the nature of things, that is, of human life that there be societies. Thus the ethical order is a natural order based on sociability, inherent in nature of being a human being; an order that, however, must always be defended because, in reality, man has many contradictions in himself: not everyone will pull their weight, jealously corrodes social order, and some will seek unfair advantage over others. It is a miracle that society does exist, but it must exist in order to facilitate human flourishment. Thus the ethical order is an order based on reason restraining passions, but also on the structure of the subject, who is relational and not oppositional.

Il ruolo degli enti territoriali nel sistema economico globalizzato

Candido Volpe

L'erosione della sovranità statuale nel sistema economico globalizzato

In via preliminare va evidenziato che il sistema ordinamentale di riferimento si sta caratterizzando con una profonda «erosione alla sovranità statuale»[1] e con la disarticolazione delle funzioni centrali in realtà periferiche e nel contempo di cessione di competenze verso l'alto in favore di organismi sovranazionali[2].

Sul punto va evidenziato che l'impronta federalista contemporanea è la naturale conseguenza della crisi dello Stato nazionale, dove la sua erosione e disarticolazione si manifesta fortemente diffusa in numerosi Stati europei (Spagna, Germania, Belgio e Austria) con formule organizzative diversificate, ma tutte legate da una linea di intervento omogenea ispirata dall'esigenza di costruire modelli di stato territoriale che coniughino il livello di unitarietà con un significativo grado di autonomia dei livelli sub-statali e intermedi di governo[3].

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[1] N. Longo, *I livelli essenziali delle prestazioni quale clausola di omogeneità sul territorio nazionale*, Roma 2012, p. 25 ss.

[2] L. Chieffi, *Regioni ed enti locali dopo la riforma del Titolo V della Costituzione, fra attuazione ed ipotesi di ulteriore revisione*, Torino 2004, p. 18 e ss.

[3] N. Longo, *I livelli essenziali delle prestazioni*, cit., p. 12. Con riguardo all'esperienza italiana, uno dei profili che maggiormente si avvicina ai caratteri propri di uno Stato federale può essere individuato nel nuovo riparto delle competenze legislative tra lo Stato e le regioni. Nel merito si rappresenta che l'equiordinazione tra leggi regionali e statali risulta soltanto parziale per un insieme di evidenze costituzionali, tra le quali le c.d. materie trasversali di competenza statale, nonché al ruolo statale di tutore delle istanze unitarie. Sul punto vedasi E. Ferioli, *Sui livelli essenziali delle prestazioni; le fragilità di una clausola destinata a contemperare autonomia ed eguaglianza,* «Le Regioni», 2/2006. A. Anzon, *Le potestà legislative dello Stato e delle Regioni*, Torino 2006.

A partire dalla metà del Novecento, si è infatti affermata, non solo in Europa, una progressiva erosione del concetto tradizionale di sovranità statale, attraverso la cessione di competenze statuali a vantaggio di organismi sovranazionali e nel contempo di ripartizione del potere centrale tra le diverse articolazioni dello Stato già unitario. Tale processo rimane indissolubilmente relazionato al fenomeno della globalizzazione dell'economia, che ha posto in luce, insieme all'inadeguatezza dell'ordinamento statale, l'esigenza di strumenti di governo sovranazionale dell'economia, invertendo il rapporto tra Stati e mercati[4]. Non è più lo Stato-nazione a regolare i rapporti ed i processi economici del mercato, ma è quest'ultimo a condizionare le forme e le funzioni dell'ordinamento statuale.

Infatti sono proprio le nuove esigenze di governo dell'economia globalizzata a rappresentare il grimaldello dell'erosione alle competenze dello Stato nazionale.

Tale processo devolutivo si manifesta sul piano della produzione normativa come cessione di competenze e di funzioni statuali verso l'alto (Europa) e nel contempo verso il basso (autonomie territoriali) e di condivisione di funzioni pubbliche tra più livelli di governo insistenti sulle medesime comunità, assumendo un ruolo particolarmente intenso anche nella recente esperienza italiana[5].

Però mentre gli altri sistemi decentrati europei si sviluppano con una rigida e separata contrapposizione tra due livelli di governo (quello statale e quello federale) fra i quali vengono ripartite le funzioni pubbliche (legislative, amministrative, giurisdizionali), del tutto di-

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[4] N. Longo, *I livelli essenziali delle prestazioni*, cit., p. 22 ss. Secondo l'autore anche negli ordinamenti dualistici ispirati al principio di completa separazione delle rispettive competenze tra i diversi livelli di governo, si sono progressivamente affermate esigenze di adeguate relazioni interordinamentali. Proprio negli Stati Uniti è nata la teoria della Political Safeguards della struttura federale dell'ordinamento. Nel caso di specie la garanzia dell'assetto federale statunitense viene riposta, oltre che nelle funzioni arbitrali della Corte Suprema, nella prevista partecipazione degli stessi stati-membri, tramite il Senato, alla funzione legislativa e alla scelta di giudici e alti funzionari federali, nonché tramite il meccanismo elettorale della nomina del Presidente degli Stati Uniti. Sul punto vedasi J.H. Choper, *Judicial Review and the National Political Process,* Chicago 1980.

[5] N. Longo, *I livelli essenziali delle prestazioni*, cit., p. 12.

versificata si presenta la qualificazione dell'ordinamento giuridico italiano, alla luce dei cambiamenti determinati dalla legge di revisione costituzionale n. 3/2001[6], con un impianto in linea generale rimasto immutato nella sostanza anche dopo l'emanazione delle disposizioni di riordino degli enti locali introdotte con la legge n. 56 del 2014 (legge Del Rio).

In sede ricostruttiva, l'architettura costituzionale così delineata si allontana dai principi dei sistemi federali classici, articolati su due livelli di governo e finisce per snodarsi nell'ottica di un sistema policentrico come quello cristallizzato nella riforma del Titolo V della Costituzione[7].

Mentre gli ordinamenti dualistici e bipolari prevedono e stabiliscono un principio di completa e rigida separazione delle rispettive competenze tra i diversi livelli di governo, l'ordinamento giuridico italiano si configura come un sistema istituzionale multilivello reticolare strutturato su relazioni interordinamentali[8].

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[6] B. Caravita, *Lineamenti di diritto costituzionale federale e regionale*, Torino 2006, p. 31.

[7] T. Groppi, M. Olivetti, *La Repubblica delle Autonomie*, Torino 2001, p. 45. Sul punto si veda L. Chieffi, *Evoluzione dello Stato delle autonomie e tutela dei diritti sociali*, Padova 2001; L. Chieffi, *I diritti sociali tra regionalismo e prospettive federali*, Padova 1999. Secondo l'autore il sistema normativo che deriva dalla nuova architettura istituzionale alla luce della revisione costituzionale del Titolo V, intende la Repubblica come un ordinamento generale di cui lo Stato è parte e di cui Comuni, Province, Città Metropolitane e le Regioni sono componenti costitutive con pari dignità costituzionale. Rispetto a tale innovato quadro costituzionale, il legislatore di revisione costituzionale ha rimodulato la stessa nozione di interesse nazionale, con la previsione di istituti di garanzia posti a tutela di beni costituzionali, quali l'unità giuridica ed economica, la tutela dei livelli essenziali delle prestazioni in materia di diritti civili e sociali, l'incolumità e la sicurezza pubblica, nonché il rispetto degli obblighi di derivazione comunitaria e internazionale.

[8] N. Longo, *I Livelli essenziali delle prestazioni*, cit., p. 15 ss. Sul punto vedasi anche L. Chieffi, *Evoluzione dello Stato delle autonomie*, cit., p. 16 ss. Secondo l'autore anche «un sistema istituzionale multilivello reticolare o matriciale [ha] necessariamente bisogno di un ordine, perché esso non sarà mai, nella realtà, perfettamente simmetrico come la sua rappresentazione ideale: e quando si stabiliscono asimmetrie, non appena si individua una cabina di regia, allora si determina la formazione di un nuovo centro, quale esso sia, con il rischio che all'assetto gerarchico tradizionale si sostituiscano asimmetrie di mercato; a meno che, naturalmente, tali nuovi

Il sistema policentrico dell'ordinamento statuale italiano

Va acquisito come punto di partenza che la riforma del Titolo V della Costituzione ha modificato profondamente l'architettura istituzionale ed i rapporti tra Stato, Regioni ed autonomie locali, dando vita ad una riorganizzazione del precedente sistema istituzionale. Richiamando il principio di sussidiarietà orizzontale e verticale, la legge di revisione costituzionale n. 3/2001 ha riformulato le competenze tra Stato ed enti territoriali, ridisegnando il ruolo di queste ultime[9].

La spinta riformatrice era finalizzata nel tentativo di creare una rinnovata forma di Stato di ispirazione federalista tesa a riconoscere più ampi spazi di autonomia agli enti territoriali, fermo restando i principi di unità ed indivisibilità della Repubblica, secondo quanto stabilito dall'art. 5 Cost.[10]

Tale premessa acquista fondamentale importanza per inquadrare la collocazione degli enti territoriali all'interno dell'architettura costituzionale, e con essa l'interrogativo se un sistema frammentato nelle competenze, come quello attuale, possa assicurare stabilità al rapporto dialettico territorio-istituzione.

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moduli operativi non siano chiamati ad operare in un contesto fortemente solidaristico, che suppone tuttavia la presenza di regole di solidarietà gerarchicamente sovraordinate e dunque di un centro capace di imporle».

[9] T. Groppi, M. Olivetti, *La repubblica delle Autonomie*, cit., p. 39. Secondo Rescigno (*La riforma da riformare*, «La rivista del Manifesto», 2001), nella nuova architettura costituzionale del Titolo V «non c'è nessun soggetto che impersona e dunque fa agire la Repubblica come ente unitario, con la conseguenza che la riforma si pone in netto contrasto con i principi ispiratori della prima parte della Costituzione».

[10] G. De Muro, art. 114 Cost., in R. Bifulco, A. Celotto, M. Olivetti (a cura di), *Commentario alla Costituzione*, vol. III, Torino 2006, p. 2168. Per parte della dottrina lo Stato regionale è una forma intermedia tra Stato centralizzato e Stato federale. Secondo l'autore, dalla riforma dell'art. 114 emerge uno stato regionale policentrico, una forma di stato nel quale convivono in un unico ordinamento una pluralità di ordinamenti territoriali minori, fra di loro equi ordinati e dunque connotati da una pari dignità istituzionale. «Il significato da attribuire al 1 comma dell'art. 114 è rappresentato, quindi, dalla novità del riconoscimento di una posizione paritaria a tutti gli enti costitutivi della Repubblica, che possono concorrere, paritariamente, alla costruzione delle politiche pubbliche garantendo, nel contempo, una pluralità di differenti interessi territoriali, che, pur articolati in differenti ordinamenti, si riconoscono in unica Repubblica».

L'idea che il nuovo art. 114, I comma aveva inteso regolamentare era quella di una statualità che doveva partire dal basso, dal livello di governo più vicino al cittadino e si doveva svolgere progressivamente in enti territoriali di maggiori dimensioni, disposti come cerchi concentrici. In questa prospettiva l'art. 114, I comma, si fondeva con il principio di sussidiarietà enunciato dall'art. 118, 1 e 4 comma[11].

Tale principio di sussidiarietà, dopo la riforma del Titolo V della Costituzione, finiva per amalgamarsi a livello costituzionale con l'art. 118, comma 1 della Costituzione che assegnava le funzioni amministrative ai Comuni salvo che per assicurarne l'esercizio unitario, dovevano essere conferite a Province, Città Metropolitane, Regioni e Stato, sulla base dei principi di sussidiarietà, differenzazione ed adeguatezza.

Tale principio si configurava altresì con una posizione dualistica: in senso verticale, quando la ripartizione gerarchica delle competenze doveva essere spostata verso gli enti più vicini ai bisogni del territorio; in senso orizzontale quando il cittadino come singolo o attraverso i corpi intermedi, doveva avere la possibilità di intervenire sulle realtà sociali a lui più vicine.

Si delineava quindi come criterio organizzativo e ripartito, da un lato teso a favorire tanto la gestione della *res pubblica* da parte delle autorità amministrative più attigue alle istanze sociali, dall'altra come autonoma iniziativa di cittadini, singoli o associati, per lo svolgimento di attività di interesse generale[12].

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[11] T. Groppi, M. Olivetti, *La Repubblica delle Autonomie*, cit., p. 30. Sul punto si segnala la sentenza n. 106/2002 della Corte Costituzionale secondo la quale i principi introdotti (dalla riforma del titolo V) non hanno intaccato le idee sulla democrazia, sulla sovranità popolare e sul principio autonomistico che erano presenti e attive sin dall'inizio dell'esperienza repubblicana. Semmai potrebbe dirsi che il nucleo centrale attorno al quale esse ruotavano abbia trovato oggi un positivo eco nella formulazione del nuovo art. 114 della Costituzione, nel quale gli enti territoriali autonomi sono collocati al fianco dello Stato come elementi costitutivi della Repubblica quasi a svelarne, in una formulazione sintetica, la comune derivazione dal principio democratico e dalla sovranità popolare.

[12] G. Pastori, *Sussidiarietà e diritto alla salute*, «Diritto Pubblico», 2002, p. 15. In termini più descrittivi è stato enunciato che il principio in esame implica che ogni qual volta sia possibile, le attività preordinate ai fini sociali e pubblici debbono essere esercitate dai soggetti singoli o associati, dalle famiglie e dalle formazioni sociali di cui all'art. 2 Cost., con la precisazione che nei confronti delle autorità pub-

La nuova ricostruzione dell'architettura costituzionale conduceva all'affermazione di un modello decentrato di amministrazione pubblica, sotto un profilo amministrativo; mentre la sussidiarietà orizzontale conduceva al ritiro dello Stato dall'economia, alle privatizzazioni ed alla deregolamentazione amministrativa[13]. Lo scopo del Legislatore era quello di invertire la trasmissione delle informazioni e delle decisioni che non dovevano più essere indirizzate alle amministrazioni, bensì dal basso cioè dal cittadino che diventava, come singolo o nelle formazioni sociali, il perno e l'unico ed esclusivo destinatario delle iniziative pubbliche[14].

Il tentativo che alenava e traspariva dall'impianto riformatore era dunque quello di costruire un sistema articolato su più punti di forza: per l'appunto un sistema policentrico e non bipolare, legato nelle singole componenti dal principio di leale collaborazione, come sancito più volte dall'intervento della Corte Costituzionale[15].

Un ordinamento multilivello, di ben cinque livelli di governo (comunitario, statale, regionale, provinciale e comunale), le cui sfere di intervento si dovevano intersecare ed amalgamare tra loro in ossequio al principio della leale collaborazione, più volte sancito dalla Corte Costituzionale, ma che sul piano pratico hanno finito per sovrapporsi, non soltanto sul terreno delle funzioni amministrative, ma anche su quello delle stesse funzioni legislative e regolamentati, secondo regole

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bliche si configurerebbe «un ruolo di promozione e coordinamento delle attività di iniziativa privata» (A. Gualdani, *I servizi sociali tra universalismo e selettività*, Milano 2007, p. 214).

[13] P. Rescigno, *Principio di sussidiarietà orizzontale e diritti sociali*, Torino 2008, p. 10. Q. Camerlengo, art. 118 Cost., in R. Bifulco, A. Celotto, M. Olivetti (a cura di), *Commentario alla Costituzione*, Torino 2006, vol. III, pp. 2333, 2340 e 2351. Si veda anche N. Longo *I livelli essenziali delle prestazioni quale clausola di omogeneità sul territorio nazionale,* cit., p. 42; sul punto vedasi anche A. Travi, *Riflessioni su laicità e pluralismo,* «Diritto Pubblico», 2006, p. 381. È stato osservato che «dalla Chiesa e dal diritto canonico, la nozione di sussidiarietà penetra, poi, nei diritti statali» (S. Cassese, *L'aquila e le mosche*, «Il Foro Italiano», 1995, p. 32).

[14] Lo Statuto della Regione Campania, all'art. 18 comma 5 specifica che la Regione, in applicazione del principio di sussidiarietà, riconosce il ruolo delle autonomie funzionali, le valorizza e ne assicura la partecipazione e la consultazione nello svolgimento delle funzioni istituzionali.

[15] T. Groppi, M. Olivetti, *La Repubblica delle autonomie*, cit., p. 45.

di riparto materiale sostanzialmente diverse tra loro[16]. In sostanza dal disegno istituzionale elaborato sulla nuova forma di architettura costituzionale emergeva uno «Stato regionale policentrico nel quale dovevano convivere in un unico ordinamento una pluralità di ordinamenti territoriali minori, fra di loro equiordinati e dunque connotati da una pari dignità istituzionale»[17].

In realtà la nuova architettura costituzionale disegnata dall'art. 114 Cost. rimane solo ed esclusivamente un mero fattore di indicazione, limitato alla disposizione letterale della norma costituzionale, ma che nell'applicazione pratica ha determinato una sovrapposizione di funzioni, ed una frammentarietà di competenze. Gli ultimi anni hanno visto l'affermarsi del centralismo regionale, dove ad un peso egemonico nelle sue funzioni amministrative ha fatto da contraltare il suo depotenziamento legislativo circoscritto nella produzione di norme di scarsa rilevanza sul piano delle tematiche, tutto a vantaggio della legislazione statale.

La legge n. 56/2014 (riforma Delrio)

In tale contesto si inserisce l'emanazione della legge n. 56/2014 che avrebbe dovuto in realtà rappresentare, per espressa indicazione del Legislatore, una disposizione transitoria, nel senso che avrebbe dovu-

[16] N. Longo*, I livelli essenziali delle prestazioni*, cit., p. 100. Nel merito si evidenzia che il processo istituzionale devolutivo di poteri e funzioni, originariamente tutti concentrati nella sovranità statale, si è manifestato in forme particolarmente intense nelle recenti esperienze dei paesi europei. Peraltro la perdita di sovranità degli Stati a vantaggio di organizzazioni sovranazionali è in larga parte correlata al venir meno delle contrapposizioni internazionali in blocchi e alla conseguente vorticosa accelerazione dei processi di globalizzazione dell'economia, registratasi negli ultimi decenni del '900. Tali processi evolutivi di ordine economico hanno progressivamente posto in luce l'esigenza di strumenti di governo sovranazionale dell'economia, fino a potersi concepire una sorta di funzionalità invertita tra Stati e mercati: sempre più gli Stati tendono a diventare funzionali ai mercati. Sul punto si veda M.R. Ferrarese, *Le istituzioni della globalizzazione, Diritto e diritti nella società transnazionale*, Bologna 2000, p. 14 e ss. Analogamente A. Baldassarre, *Globalizzazione e internazionalizzazione dei diritti*, Milano 2003, p. 81 e ss.

[17] T. Groppi, M. Olivetti, *La Repubblica delle autonomie*, cit., p. 44.

to fungere da ponte tra il previgente sistema di organizzazione degli enti locali e quello che sarebbe conseguito al compimento del procedimento di revisione costituzionale, avviato con il d.d.l. costituzionale Boschi-Renzi.

Tale riforma doveva offrire l'occasione per riformare e superare il bicameralismo legislativo[18].

Ma la mancata approvazione della riforma costituzionale ha lasciato in sospeso una serie di questioni fondamentali: possibilità di trasformare le Province in enti di secondo grado, delimitazione dei poteri dello Stato e delle Regioni nella geografia amministrativa e problematica di riferimento, prospettive nelle assegnazioni delle funzioni degli Enti Locali.

In quest'ottica la scelta del governo è stata quella di non ridefinire la struttura istituzionale e la *governance* degli enti locali.

Nel caso di specie l'intelaiatura costituzionale, letta insieme al più generale principio autonomistico sancito nell'art. 5 Cost., presuppone che l'ente locale sia un luogo di autonoma elaborazione di un indirizzo politico del territorio, e non pura sede di coordinamento dell'azione di altri enti.

L'aspetto generale non è un problema di modalità elettorali degli organi di governo, ma un problema più generale di rappresentatività di un ente nei confronti della comunità che amministra e della popolazione che vi abita.

Infatti la proprietà transitiva degli enti deve essere costituita da principi di democraticità in modo da rispecchiare il principio di sovranità popolare.

A questo si aggiunge un radicale depotenziamento delle funzioni in netta controtendenza con i principi di sussidiarietà ed adeguatezza che in più occasioni ha pervaso lo spirito riformatore del Legislatore europeo, e che aveva caratterizzato il disegno costituzionale di cui al Titolo V della Cost.

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[18] F. Fabrizzi, *Sul riordino delle Province nel decreto salva Italia*, in www.federalismi.it.

Enti territoriali quali prospettive?

Va evidenziato che in un sistema sempre più globalizzato viene sempre meno quella corrispondenza tra governo, popolo, territorio che aveva caratterizzato la modernità politico istituzionale ed il costituzionalismo del Novecento[19].

Da un esame ricostruttivo emerge un movimento oscillatorio tra accentramento ed autonomia, che da sempre ha condizionato le sorti degli enti locali.

È proprio in questo rapporto dialettico che va inquadrato il nuovo rapporto tra centro e periferia**.**

Infatti tale considerazione scaturisce dalla consapevolezza che la mancanza di corrispondenza tra gli elementi costitutivi dell'ordinamento rimane uno dei fattori tipici della condizione politico-istituzionale post-moderna, ed è nel contempo uno dei principali fattori di crisi della rappresentanza politica.

In realtà, rimane innegabile che i problemi di un determinato territorio possono essere adeguatamente risolti solo mediante l'esercizio delle funzioni di governo delle istituzioni di quel territorio.

Infatti i processi decisionali che determinano il buon esito e l'efficacia di una politica pubblica scaturiscono proprio dal coordinamento e dalla coerenza delle decisioni assunte su un preciso e specifico territorio[20].

Il momento decisionale per essere efficace deve partire da un ente territoriale omogeneo e sulla cui base costruire un meccanismo semplificatorio, che riduca per quanto possibile la discrasia tra confini delle autonomie territoriali, rappresentanza politica e cura di interessi settoriali.

In sede ricostruttiva, sono proprio i Comuni ma anche le Province ad essere gli enti autonomi più omogenei territorialmente.

Nel merito va ribadita che la tendenza al centralismo regionale affermatasi negli ultimi decenni, come innanzi evidenziato, rimane accompagnata da una dequotazione sostanziale del ruolo dei legislatori

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[19] V. Casamassima, in www.federalismi.it.

[20] F. Patroni Griffi, *La Città metropolitana e il riordino delle autonomie territoriali. Un'occasione mancata*?, in www.federalismi.it.

regionali stessi, ridotti spesso a produrre normative di scarsa rilevanza sul piano politico e programmatico, senza emanciparsi dai vincoli dettati dalla normativa statale che ha continuato di fatto ad occupare gli spazi consentiti dal previgente Titolo V, senza dubbio favorita dall'inadeguatezza economica, organizzativa e funzionale che caratterizza l'amministrazione locale[21].

L'intelaiatura costituzionale ha cercato di svilupparsi in un sistema binario e quindi polarizzato fondato sul confronto Regione-Comuni evidenziando però che proprio la frammentarietà e la diversificazione dei Comuni non ha permesso di sviluppare una relazionalità diretta con la Regione stessa.

Infatti una ipotetica riorganizzazione sistemica delle funzioni degli Enti Locali deve partire dal concetto di relazione, intesa come confronto interlocutorio alla soluzione delle problematiche amministrative.

Non quindi un ente territoriale chiuso e confinato nel suo territorio, ma aperto nell'affrontare le problematiche e le criticità del territorio di competenza.

Peraltro anche la presenza di un ente intermedio sarebbe in grado di svolgere una fase di organizzazione e coordinamento, favorendo gli strumenti di partecipazione democratica.

Infatti tale ente avrebbe sicuramente la possibilità di cogliere le istanze solidaristiche del territorio, e nel contempo continuare a svolgere quella funzione di ente intermedio tra Regione e Comuni[22].

Rimane innegabile che qualsiasi tentativo di ridisegnare il ruolo e le competenza degli enti territoriali finisce per cozzare con un sistema disarmonico e frammentato, che non deve mai mettere in discussio-

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[21] F. Patroni Griffi, *La Città metropolitana e il riordino delle autonomie territoriali*, cit.

[22] L. Chieffi, *Evoluzione dello Stato delle autonomie*, cit., p. 12 ss. Si veda anche C. Tubertini, *Il riassetto delle funzioni amministrative locali: cronaca di una riforma solo in parte realizzata*, in L. Vandelli, G. Gardini, C. Tubertini, *Le autonomie territoriali: trasformazioni e innovazioni dopo la crisi*, Rimini 2017, pp. 225-249. Secondo l'autore l'intervento del legislatore regionale in questi anni è stato in qualche modo indirizzato se non addirittura reso obbligato dal legislatore statale, che ha finito, quindi, per condizionare fortemente anche gli spazi in cui esse avrebbero potuto esercitare effettivamente un ruolo autonomo.

ne il principio della indivisibilità della Repubblica, come peraltro più volte affermato dagli arresti della Corte Costituzionale che in più di una volta si è sforzata di affermare che «nell' assetto costituzionale allo Stato deve essere sempre riservata, nell'ordinamento generale della Repubblica, una posizione peculiare desumibile non solo dalla proclamazione di principio di cui all'art. 5 della Costituzione, ma anche dai poteri profondamente diversi detenuti dagli enti in esso indicati». Dove i momenti decisionali devono essere elaborati attraverso un modello concertativo tra Stato ed enti territoriale attraverso il principio della leale collaborazione.

In realtà rimane innegabile che qualsiasi tentativo di ridisegnare le competenze degli enti territoriali deve essere effettuato in un disegno più ampio di riallocazione delle funzioni degli enti stessi, compreso lo Stato.

Peraltro il policentrismo paritario, come ha sottolineato anche la Corte Costituzionale, non vuole significare che «tutti gli enti costitutivi della Repubblica sono formalmente dotati dello status e rilievo per l'ordinamento, ma che l'interesse nazionale per potersi realizzare richiede la collaborazione paritaria di Stato ed autonomie, in una miscela di regole uniformi da imporre sull'intero territorio statale e di regole diverse da adottare sulla base delle esigenze peculiari delle comunità territoriali»[23].

In tale contesto e tenuto conto degli interventi della Corte Costituzionale emerge la necessità di ridisegnare il concetto di territorio, non più circoscritto in un preciso ed angusto ambito territoriale, bensì aperto all'intero territorio, recependo le istanze che provengono dal basso e attraverso un preciso raccordo con le Regioni[24]. In tal senso sa-

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[23] G. Gardini, *Crisi e nuove forme di governo territoriale*, «Istituzioni del Federalismo», 3/2015. Sul punto cfr. sentenza Corte Costituzionale considerato in diritto n. 3/2015. Si veda anche F. Patroni Griffi, *La Città metropolitana e il riordino delle autonomie territoriali. Un'occasione mancata*?, in www.federalismi.it.

[24] C. Tubertini, *Area vasta e non solo: il sistema locale alla prova delle riforme*, in www.federalismi.it. Si veda anche P. Carrozza, *Le provincie della post-modernità: la città territoriale*, in www.federalismi.it, 2018, p. 32 ss. Secondo l'autore l'ente sistema appare prevalentemente relazionale, piuttosto che regolativo; i suoi vertici politici e amministrativi sono tesi soprattutto a costruire relazioni di sistema con gli altri enti omologhi, con il governo multilivello e con la società civile.

rebbe opportuna in sede di revisione costituzionale la presenza all'interno del nostro ordinamento di una Camera delle Autonomie Locali, che sia in grado di garantire «la partecipazioni delle realtà sub-statali al procedimento legislativo, rendendo più elastica un'eventuale separazione delle competenze e per di più favorendo una continua rimodulazione del principio di sussidiarietà».[25] Infatti il nostro ordinamento è carente di una Camera di rappresentanza dei territori, che può consentire alle regioni e alle realtà sub-statali di compensare la sottrazione della competenza legislativa attraverso una partecipazione sul contenuto del provvedimento al momento della sua formazione e contempo risolvere il problema della rappresentanza di regioni ed enti locali nelle sedi istituzionali[26]. Così sintetizzato, il nuovo riparto della potestà legislativa avrebbe l'ambizione di eliminare criticità di sovrapposizione tra la competenza statale e quella regionale, rimuovendo elementi di conflittualità tra centro e realtà periferiche, con l'obiettivo di rafforzare il ruolo dello Stato nei confronti di quello regionale[27]. In questa prospettiva si può agevolmente affermare che sussistono sufficienti margini per una rivisitazione delle funzioni degli enti territoriali, e come le stesse rimangono in grado di assicurare, anche per il futuro, forme omogenee ed efficaci di intervento amministrativo anche in un sistema politico ed economico globalizzato**.**

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[25] L. Ferraro, *La cooperazione anomala nello Stato Composto Spagnolo*, Milano 2010, p. 194.

[26] Ibid. Secondo l'autore le seconde Camere a composizione federale svolgono, accanto a una evidente funzione di raccordo politico, anche una funzione di riequilibrio delle relazioni federali; costituiscono, cioè, una sorta di controbilanciamento istituzionale ai maggiori poteri assunti dal centro grazie allo sviluppo di altri strumenti caratteristici del modello cooperativo di decentramento. Sul punto si veda anche B. Baldi, *Stato e territorio. Federalismo e decentramento nelle democrazie contemporanee,* Roma 2003.

[27] F. Bertolini, *La riforma della Camera delle autonomie fra rappresentanza politica e rappresentanza territoriale*, «Rassegna Parlamentare»*,* 4/2003. Secondo l'autore «la necessità di adottare la presenza di una seconda Camera porta naturalmente con sé una rappresentanza degli elettori incentrata sulla qualità che deriva loro in ragione del luogo dove essi abitualmente vivono all'interno della comunità nazionale, rappresentandoli dunque non già in quanto componenti di una parte politica del paese, bensì in quanto componenti di una parte territoriale del paese stesso».

Identity matters. Reflections on the "Israelite matrices" of American identity

Silvano Poli

Introduction

In 1819, the leaders of the anti-Federalist party, Jefferson, Madison and Monroe, were driven by a profound aspiration and moral commitment to establish the University of Virginia. In December of the same year, Jefferson, the "Monticello's wise", conveyed to W. Roscoe his vision of an institution that would be established «based on the illimitable freedom of thought»[1] and that this great achievement would then extend to the entire Nation. This aspiration was borne out by the University of Charlottesville, which was the first institution in the US to establish a clear separation between higher education and religious doctrine[2]: indeed, for many decades, it was the only such institution. A staunch deist, Jefferson believed that the «professorship of theology should have no place in our institution»[3]. It would be necessary to await the conclusion of the Civil War and the lengthy period of Republican hegemony in the latter half of the 19th century before these ideals could be also disseminated to the New England universities, the so-called "nine colonial colleges." These institutions were founded upon the legacy of the preachers and theologians of the pre-

[1] «Thomas Jefferson to William Roscoe, 27 December 1820», Founders Online, National Archives and Records Administration, https://founders.archives.gov/documents/Jefferson/03-16-02-0404.

[2] J.J. Ellis, *American sphinx: the character of Thomas Jefferson*, Knopf, New York 1997, p. XXV.

[3] «Thomas Jefferson to Thomas Cooper, 7 October 1814», Founders Online, National Archives and Records Administration, https://founders.archives.gov/documents/Jefferson/03-08-02-0007.

vious century and were characterized by a profound religious fervour in their teachings.

The contemporary allows for the observation of events that appear to be pivotal in the understanding of the characteristics of the United States of America: among these events there are the pro-Palestinian and anti-Israel protests that are occurring on American university campuses. These events serve to highlight two key points. Firstly, the unrestricted freedom of thought that Jefferson advocated for has not been achieved either in the university or the nation. Secondly, even two centuries later, the proselytist and religious dimension continue to exert an influence on the so-called "high culture" (university students and academia), as well as on American "low culture" – and it is evident that this distinction is not always straightforward and clear.

It is reasonable to question whether the vehement and perhaps disproportionate response to the protests – there have been over 2.000 arrests at various universities and numerous incidents of violence in other context[4] – is not driven by factors other than the defence of the foreign policy positions of the current administration. Since October 7, it has become evident that support for Israel is a foundational assumption of foreign policy, which involves International Relations studies. However, this unwavering support and solidarity also appears to be a significant factor among common citizens, as evidenced by the strong reaction against those who oppose Israel (including Jews)[5]. The fundamental question, therefore, is "why?".

This text sets out to provide an answer to the question posed by reflecting on the origins of the concepts of "Americanism and the People" that inform American culture and political identity. Following the lead of recent approaches in political science that focus on the discur-

[4] https://www.theguardian.com/us-news/live/2024/may/01/university-protests-pro-palestinian-demonstrators-arrested-latest-news.

[5] C. Von Quednow, E. Levenson, *Pro-Palestinian protest outside LA synagogue criticized as 'antisemitic' after street fights with pro-Israel protesters*, «CNN US», 24-06-2024: https://edition.cnn.com/2024/06/24/us/los-angeles-synagogue-palestinian-israeli-protest-violence/index.html; N. Sauer, *For many American Jews protesting for Palestinians, activism is a journey rooted in their Jewish values*, «The Conversation», 21-05-2024: For many American Jews protesting for Palestinians, activism is a journey rooted in their Jewish values (theconversation.com).

sive dimension as a fundamental element in identity formation[6], considering culture as a semiotic context[7] and focus on certain elements of the discourse of 18th-century pastors and theologians. The continuing relevance of the Awakenings linked to the "Great Awakening" tradition of the 18th century is emphasised, with particular focus on the origin of the use of Old Testament themes and the consequent "symbolic-symbiotic" link between American and Israelite identity. Furthermore, this contribution demonstrates how the affirmation of these elements, now regarded as hallmarks of the concept of "Americanism", was the outcome of a discursive and doctrinaire clash between the Southern and Northern colonies prior to Independence, and how these elements influenced subsequent political developments.

The "Awakenings": navigating the intersection of faith and politics

In recent months, the Al-Jazeera broadcaster's documentary *Praying for Armageddon*[8] has generated considerable interest. The programme

[6] D. Howarth, *Discourse*, McGraw-Hill Education, London 2000, chapter 6 and 7; M.V. Jørgensen, L.J. Phillips, *Discourse Analysis as Theory and Method*, Sage, London 2002, pp. 5-28; D. Howarth, *Applying discourse theory: The method of articulation*, in D. Howarth, J. Torfing (Ed.), *Discourse theory in European politics: Identity, policy and governance*, Palgrave Macmillan, London 2005, pp. 316-349; R. Wodak, *The discourse of politics in action: Politics as usual*, Springer, London 2009; J. Glynos, D. Howarth, R. Flitcroft, C. Love, K. Roussos, J. Vazquez, *Logics, Discourse Theory and Methods: Advances, Challenges, and Ways Forward*, in «Journal of Language and Politics», 20(1)/2021, pp. 62-78.

[7] M. Kranert, *Discourse and political culture. The language of the Third Way in German and the UK*, John Benjamins Publishing Company, Amsterdam 2019, pp. 12-32; A. Pickel, *Cultures as semiotic systems: reconceptualizing culture in a systemic perspective*, in M.R. Matthews (Ed.), *Mario Bunge: A Centenary Festschrift*, Springer, London 2019, pp. 415-438; A. Pickel, *Nations, national cultures, and natural languages: A contribution to the sociology of nations*, in «Journal for the Theory of Social Behaviour», 43(4)/2013, pp. 425-445. See also, R. Posner, *Was ist Kultur? Zur semiotischen Explikation anthropologischer Grundbegriffe*, in M. Landsch, H. Karnowski, I. Bystřina (Eds.), *Kultur, Evolution: Fallstudien und Synthese*, Lang, Frankfurt 1992, pp. 1-65.

[8] «*Praying for Armageddon. Why evangelicals influence US foreign policy in the Middle East*»: https://www.youtube.com/watch?v=IhT7oyDlBIk&t=1767s.

focuses on the rallies and beliefs of evangelical sects and churches, which are regarded as a significant pressure group in foreign policy and a pivotal component in the United States. Far beyond the institutional lobbying, that is well documented in the literature[9], the documentary focuses on the particularities and work of evangelical churches and associations in strengthening the link between the destinies of the American nation and Israel. One of the main protagonists is Pastor G. Burd, leader of the M-25 mission: the name of his community comes from a few verses in Book 25 of the Gospel of Matthew[10]. Burd and his followers, reminiscent of Hell's Angels in their aesthetics and Knights Templar in their fervour, ride their Harley-Davidson motorbikes around the United States performing charity work and proselytising in large-scale events called "Awakenings". The name "Awakenings" is loaded with meaning for American identity and political culture, as the "Great Awakening" of the 18th century can be considered a fundamental event in the birth of politics and the United States. In his orations, Burd proclaims the fulfilment of the prophecies of the "Book of Revelations", baptizes new adepts, and consecrates them knights with an oath on the knees and sword. Burd and the evangelicals posit a correlation between the Second Coming of Christ (this time in the US) and the conquest of Jerusalem by the Jewish state. They also assert that they are actively engaged in efforts to bring about the fulfilment of the "seven years of tribulation" that will culminate in a final confrontation between the forces of good (the Christian US and Israel) and those of evil. It is possible to perceive this outcome as somewhat predictable, given the extensive body of literature on the role of religion in US politics and the ideological foundation underlying US politics and nationalism. The outcome of these studies is, in almost all cases, the identification of a national ideology characterised

[9] A.R. Schaefer, *Evangelical global engagement and the American State after World War II*, in «Journal of American Studies», 51(4)/2017, pp. 1069-1094; M. McAlister, *American evangelicals, the changing global religious environment, and foreign policy activism*, in «The Review of Faith & International Affairs», 17(2)/2019, pp. 1-12.

[10] «I was hungry, and you gave me something to eat, I was thirsty, and you gave me something to drink, I was a stranger, and you invited me in, I needed clothes and you clothed me, I was sick and you cured me, I was in prison and you came to visit me» Matthew 25:42-44.

by the «enduring and dominant belief that we have a mission in the world and must make a unique contribution to history»[11].

In the aftermath of September 11, K. Minogue revisited one of his seminal works from the 1960s, elucidating the schism between American nationalism, defined by the absence of a cult of the strong state, and European nationalism[12]. Beyond the comparisons that have engaged the attention of political scientists for almost a century, it is crucial to elucidate the genesis and the historical moment at which this distinctive political culture first emerged. However, there is no consensus regarding the initial period during which this worldview and the associated ideas about the nation and its constituents first took shape. The work of C. van Tyne and his heirs contributed to the dissolution of the link between the War of Independence and the establishment of American national identity. According to the historian, the «spirit of '76 was characterised by an average level of enthusiasm for independence, loyalty to a great commander, hatred of George III, but certainly not by love of country or a great ideal, or a cause more precious than life itself»[13]: patriotism is not a spontaneous phenomenon, but rather a gradual process of maturation. R. Bellah, however, suggested that independence was likely "mentally" achieved in the latter half of the eighteenth century, preceding the emergence of the concept of a nation with universal authority. During this period, colonists «developed a self-consciousness (*as Americans*), yet did not imagine an American nation»[14]: this may be regarded as an anomalous case in which a political identity is not only established prior to the formation of a state to embody it, but also in the absence of such an entity.

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[11] E.L. Tuveson, *Redeemer Nation: The idea of America's millennial role*, University of Chicago Press, Chicago, London 1968, p. 164.

[12] K. Minogue, *Managing Nationalism*, in «New Left Review», 23/2003, pp. 95-99; K. Minogue, *Nationalism*, Basic Books, New York 1967.

[13] C. Van Tyne, *The American Revolution: 1776-1783*, Harper, New York 1905, p. 113.

[14] R.N. Bellah, *Habits of the Heart, With New Preface: Individualism and Commitment in American Life*, University of California Press, Oakland 2007, p. 9; italics by the author.

An historian interested in American political culture and identity such as R. Kelley, has traced the formation of a particular national identity distinct from nationalism. This «embodied ideology», as his mentor R. Hofstadter called it in *The Paranoid Style*[15], is linked to the uniqueness of a chosen people and to another awakening, the so-called "Great Awakening", inaugurated in the 1730s, represents a movement of ethical conscience-building with markedly pietistic overtones and fraught with political consequences. For almost 200 years, according to Kelley, American political culture would move around discourses that gathered a limited number of arguments in an attempt to appropriate this narrative[16]. In a collective work from the early 2000s, several French authors analysed these aspects in order to portray the United States as a country that is undergoing a process of secularisation[17]. Furthermore, from the metaphor of the "house on the hill" to Manifest Destiny, historiography and political sociology have frequently referred to the cumbersome legacy of the Puritan settlers' conceptions. Of these, the "Great Awakening" is arguably the most significant manifestation[18].

It is a misconception that the phenomenon of Awakenings (or Revivals) is an American phenomenon. In fact, such occurrences have

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[15] R. Hofstadter, *The Paranoid Style in American politics*, Vintage, New York 2012, p. 32.

[16] R. Kelley, *Ideology and Political Culture from Jefferson to Nixon*, in «The American Historical Review», 82(3)/ 1977, pp. 531-562; see also R. Beeman, S. Botein, E.C. Carter, *Beyond Confederation: Origins of the Constitution and American National Identity*, University of North Carolina press for the Omohundro institute of early American history and culture, Chapel Hill, London 1987.

[17] J.G. Mason, *Una valutazione complessiva: il divario crescente. L'eccezionalismo americano. Il ritorno alle tradizioni premoderne*, in J. Liberman (a cura di), *Quale democrazia Americana?*, Jaca Book, Milano 2005, pp. 159-178.

[18] See S.E. Ahlstrom, *Religion, revolution, and the rise of modern nationalism: Reflections on the American experience*, in «Church History», 44(4)/1975, pp. 492-504; C.L. Albanese, *Sons of the fathers: The civil religion of the American Revolution*, Temple University Press, Philadelphia 1976; T.H. Breen, *Ideology and nationalism on the eve of the American Revolution: Revisions once more in need of revising*, in «The Journal of American History», 84(1)/1997, pp. 13-39; B. Baylin, *To Begin the World Anew. The Genius and Ambiguities of the American Founders*, Knopf, New York 2003; D. Bradburn, *The citizenship revolution: Politics and the creation of the American union, 1774-1804*, University of Virginia Press, Charlottesville 2009.

been documented in Germany as early as the time of the Reformation. Moreover, the underlying religious behaviours that give rise to these awakenings can be traced back to 17th-century England and Scotland. Nevertheless, as their continued existence demonstrates, in the colonies of the new continent they rapidly became of paramount importance. The "Great Awakening" was presented as an original "public-political display of religious ethics" and subsequently nationalised. This was due to the large popular following it enjoyed. In the mid-1700s in the United States, the influence of religion extended beyond the confines of churches and into the political sphere. Pulpits were erected in a multitude of locations, including city streets, bars, printing houses, and even in the countryside and remote areas. The preachers became renowned figures, "entrepreneurs of religion", who instigated that unquenchable religious fervour which, according to de Tocqueville, «can never die in America, because it is indissolubly linked to the idea of patriotism»[19]. During the "Great Awakening", the connection between America and the idea of its "unique and exceptional destiny", the connection between a space and a divine project, became evident.

It is through the orations of these preachers that we can ascertain a prevailing belief that the orations disseminated in the colonies, or what in the terms of the discursive approach of van Dijk is defined as "cultural common ground"[20], and basis for political ideologies. In his works, Van Dijk posits that ideologies can be identified within the «conceptual and disciplinary triangle linking cognition, society, and discourse»[21]: in every system there are different ideologies in the same space, which must be distinguished from a common ground, i.e. the cultural knowledge system. Group beliefs are analogous to cultural beliefs, but on a smaller scale, as they are shared only by a specific group: frequently comprise modified cultural beliefs, such as a less rigid or more rigid approach, or simply different interpretations of truth

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[19] A. De Tocqueville, *La Democrazia in America*, Rizzoli, Milano 2012, p. 66.

[20] T.A. van Dijk, *Society and Discourse: How Social Contexts Influence Text and Talk*, Cambridge University Press, Cambridge 2008.

[21] T.A. van Dijk, *Ideology: A Multidisciplinary Approach*, SAGE, London 1988, p. 5.

or criteria. Ideologies are the foundation for these socially shared beliefs of a group and play a role at the social level. They control or organise the knowledge and interpretations of the groups, which are important for the interaction, coordination and reproduction of the group itself, the reproduction of power and domination within and between groups and provide legitimacy. Recently, to address identity formation in a historical process, others author like Gee proposes to distinguish a semiotic system between "little discourse" (d) and "big Discourse" (D): the first one (little "d") is defined as language in context, while the second "Discourse" (big "D") is the knowledge system[22]. The following references are intended to illustrate the various approaches to discourse analysis and their enduring influence on the formation of collective identity over time.

In the next section of this text, I will focus just on the origin, formation and discourse elements of a part of the American political knowledge system. A discursive approach from a historical perspective should reconstruct the evolution of the mechanisms of predication, naming, perspectivisation and the argumentative structures (*topoi*) that have been used in various messages in various media over time. This should be done by adding a triangulation approach involving the intertextual and interdiscursive relationship between utterances, texts, genres, and discourses and all the extralinguistic social variables, institutional frameworks, and the broader sociopolitical and historical context in which discursive practices are embedded and related[23]. The objective of this work is not to achieve these results; therefore, our considerations are limited and related to a pre-existing multidisciplinary literature that has demonstrated the persistence of religious elements in American politics, identity, and other domains,

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[22] J.P. Gee, *An Introduction to Discourse Analysis: Theory and Method*, Routledge, New York, London 2005, pp. 7-11.

[23] See M. Reisigl, R. Wodak, *The Discourse-Historical Approach (DHA)*, in R. Wodak, M. Meyer (Eds.), *Methods of Critical Discourse Studies*, (23-61) Sage, London 2015, pp. 23-61; R. Wodak, *Critical discourse analysis, discourse-historical approach (DHA)*, in K. Tracy (Ed.) *The international encyclopaedia of language and social interaction*, John Wiley & Sons, New York 2015, pp. 1-14, pp. 4-7.

including mass media, since the advent of the penny press in the nineteenth century to contemporary[24].

The Old Testament in Politics

This section examines the protagonists and the discursive elements surrounding the inclusion of specific elements of the Old Testament in the formation of American identity, particularly in the context of the "Great Awakening". A brief classification list of three main elements is proposed, with an emphasis on how the creation and influence of the college system helped to exert significant control over the historical interpretation of these elements for several decades.

S. Stoddard (1643-1729) was the first pastor to initiate the Revival, paving the way for what would be known as "evangelical conversion theology". He was a theologian of considerable erudition, though inclined to a fatalistic outlook. According to his contemporaries, he was «renowned for his gifts and grace, and was blessed with extraordinary success in his ministry»[25] from the outset. It can be also attested that Stoddard was held in high regard by notable figures such as J. Winthrop, a prominent figure among colonial pastors, B. Franklin and others. His doctrine, compiled in a memoir titled *A Faithful Narrative of the Surprising Work of God* (1737), has been a subject of considerable interest and discussion even in conservative think tanks from the Reagan presidency onwards[26]. However, the most renowned entrepre-

[24] A. Briggs, P. Burke, D. Smith, J. Richards, S. Yeo, *What is the History of Popular Culture?*, in J. Gardiner (Ed.), *What is History Today... ?*, Palgrave, London 1988, pp. 120-130; H. Bergmann, *God in the Street: New York Writing from the Penny Press to Melville*, Temple University Press, Philadelphia 1995; R.J. Scholnick, *Extermination and Democracy: O'Sullivan, the Democratic Review, and Empire, 1837-1840*, in «American Periodicals», 15(2)/2005, pp. 123-141; S. Hawkins, *Settling the Pop Score: Pop Texts and Identity Politics*, Routledge, London 2002, pp. 56-62; R.J. Scholnick, *Extermination and Democracy: O'Sullivan, the Democratic Review, and Empire, 1837-1840*, cit., pp. 123-141.

[25] T.S. Kidd, *The Great Awakening: The Roots of Evangelical Christianity in Colonial America*, Yale University Press, New Haven 2007, p. 66.

[26] F. Tonello, *Il Nazionalismo Americano*, Liviana, Padova 2007, pp. 47-55, p. 145.

neur of the faith was undoubtedly the Stoddard nephew, J. Edwards (1703-1758). He was a preacher, pastor, theologian, and the architect of the (re)conceptualisation of seventeenth-century millennial themes. Furthermore, he was an advocate of religious action as a political instrument for the progress of history. His contribution to historiography is twofold: first, he inaugurated the historiographical hegemony of the Northeast, and, above all, he "extended" the original Puritan framework of identity and "Mission" from New England to the entire colonial system of English-speaking America (the New England doctrine). The result of this approach was so effective that Edwards' preaching about the people and the laws led a young T. Jefferson to liken the figure of the pastor to that of the Spartan legislator Lycurgus. As the future president of the United States of America have stated, the Edwars ministry would, in the years to come, allow «even this beloved land to look like a farm divided among many brothers»[27]. Regarding the political implications of Edwards' work, an important element concerns inclusion and the characteristics of conversion[28]. In the colonies, the Half-Way Covenant, adopted by the synods of 1657 and 1662, stipulated that baptism alone was the prerequisite for civil privileges of church membership, but not for participation in the sacrament of the Lord's Supper. Stoddard, in a more liberal interpretation, argued that the Lord's Supper was a converting ordinance, and that baptism was a sufficient title to all the privileges of the church. In his argument, Edwards posited that the Lord's Supper is not the catalyst for regeneration. He further asserted that communicants should be professing Protestants, endowed with special grace, and that this grace is manifested in the immediate and supernatural divine illumination of the soul[29]. By the late 1730s, religious fervour had reached a point of considerable concern. A considerable number of New Englanders had become involved in religious revivals. However, the outcome of this involvement was not the formation of convictions but rather a belief in damnation. It is notable that

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[27] L.M. Bassani, *Il pensiero politico di Thomas Jefferson. Libertà, proprietà ed autogoverno*, Giuffrè, Milano 2002, p. 47.

[28] G.M. Marsden, *Jonathan Edwards: A Life*, Yale University Press, New Haven, London 2003.

[29] Ivi, pp. 156-157.

Edwards himself had observed that a significant number of individuals felt compelled (by Satan) to take their own lives. The evidence presented indicates that Edwards' message is evolving away from the traditional "fire and brimstone" style of preaching and towards a more nuanced approach that incorporates strong ethical values. In his writings, he sought to diminish the significance of the "bodily effects", characterizing them as secondary to the true work of God. He gradually shifted towards a more philosophical and socio-political statement of "distinctive signs"[30]. In the period preceding his demise, he published in Northampton in 1747 the treatise entitled *An Humble Attempt to Promote Explicit Agreement and Visible Union of God's People in Extraordinary Prayer for the Revival of Religion and the Advancement of Christ's Kingdom on Earth*. At the end of his life he was convinced that the new continent would usher in the renewal of the world, and believing the prophecy that the sun would "rise in the west to kiss the promised land of God's people", Edwards managed not to dissolve the Puritan tradition but to transform the apocalyptic vision of the previous century into an ongoing millennium dominated by the moral and material resourcefulness of the individual. In his view, dreary customs and terror were to be abandoned in order to encounter the glory of God fulfilled in the promised land, but without abandoning the biblical setting and language. Leaving aside the retrospective celebrations of the American protagonists – the American Clergy, for example, was almost always cold to the Revolution and only became openly anti-English after Saratoga – the crucial portents of the work of ministers like Stoddard and Edwards, of figures like T.J. Frelinghuysen (1691-1747), G. Tennent (1703-1764) and G. Whitefield (1714-1770), concern the role of American political culture and identity, the idea of Americanism and democracy, and thus the conception of man, people and government that they bequeathed.

The dominance of these authors' visions was largely enabled by the pervasive influence of the historiographical tradition and the palingenetic narrative of the American people within academic institutions. Nevertheless, although often overlooked, even prior to the post-Civ-

[30] O.D. Crisp, *Jonathan Edwards among the theologians*, William B. Eerdmans Publishing Company, Grand Rapid, Cambridge 2015, pp. 67-68.

il War resurgence, another tradition existed, with Protestant pastors in the South claiming their own narrative of America and its people. One is reminded of the myth of the "Old Three Hundreds", the parallelism between the patriarchs and the settlers as well as between Parades y Arrillaga and the Pharaoh, as well as its contribution to justifying the predestination of Texas and its people, which was asserted with great vigour before and during the 1846 war between Mexico and the United States. Even in the nineteenth century, this tradition was repeatedly evoked by one of South Carolina's most celebrated intellectuals and senators, J.C. Calhoun. In his speeches, Calhoun asserted that the Southern Federated States represented a unified and virtuous community (also to justify slavery), the only one that was fulfilling the Lord's mission. In contrast to the independent North, the South, according to Calhoun, had consistently sought justice rather than political independence, which was perceived as problematic and a potential source of discord[31]. This conception of the dangers of politics was also informed by a religious vision shaped during the Awakening era, though it differed significantly from Edwards's perspective. Unlike the Northern Puritanism that had opposed Congregationalism, and was more Presbyterian, this theology was different. C. Albanese has demonstrated that, by the end of the 18th century, South Carolina and Virginia were the states most receptive to the sermons of pastors such as J. Murray (1741-1814) and, in particular, E. Winchester (1751-1797). The latter, born near Brookline, had studied the so-called "hyper-Calvinist" thought of J. Gill with G. Whitefield and subsequently served in Boston. However, his doctrine underwent a significant transformation in the late 1770s, following his exposure to the ideas of the German mystic Paul Siegvolck (George Nicolai of Freissdorf) and his *The Everlasting Gospel* (1710). Upon his arrival in South Carolina, his reflections on the radical Reformation tradition became a defining element in American Christology[32]. In contrast to Edwards, Winchester's

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[31] R. Luraghi, *Storia della guerra civile americana*, Rizzoli, Milano 1994, p. 43; see J.C. Calhoun, *Speech on the Treaty, August, 1842*, in *The Works of John C. Calhoun*, (Vol. 4), Appleton, New York 1857.

[32] C.L. Albanese, *A republic of mind and spirit: A cultural history of American metaphysical religion*, Yale University Press, New Haven 2007, pp. 152-153, p. 157.

preaching was characterised by a focus on the past, particularly the idea of a «final and decisive recapitulation of the human race by Christ as the second Adam»[33]. This affirmation of the salvation of humanity for eternity, coupled with the necessity of perpetuating the Reformation, represented a significant departure from Edwards' teachings. The primary social consequence, at least until the end of the century, was that consistent with the tenets of the Germanic Hermetic tradition, future Southerners regarded the original Congregationalist synod as sacrosanct and, consequently, the election of England as God's chosen holy land as irrefutable[34]. America, as evidenced by the political tradition later exemplified by Calhoun, was more an extension, an appendage, but not a qualitatively distinct land of Exodus.

The divergence of opinions between the New Englanders and those in the South, which was evident from the outset and continues to be a topic of discussion to this day, led to the New Englanders' role as moral guides in the political sphere. This role involved the importation and adaptation of biblical *topoi*, discourses, metaphors and metonyms to influence the prevailing conceptions in the South. This was done with the intention of promoting the values of independence and liberty. The conflict over the future of the American nation was, in essence, a doctrinal and discursive one. They advocated the re-actualisation of the Reformation, rather than the continuation proposed by Winchester and Murray, on the ideological basis of the English providentialism that had been established between 1620 and 1660. This involved encouraging the "interventionism" and emancipatory socio-political dimension that Edwards had championed. This rhetoric became the dominant cultural discourse that shaped the conceptual framework, the interpretative model of space and way of life. Political symbols and definitions «are not metaphors for power; they are the means and ends of power itself»[35] and these elements was comple-

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[33] Ivi, p. 153.

[34] G.H. Williams, *American Universalism: A Bicentennial Historical Essay*, in «Journal of the Universalist Historical Society», 3(9)/1971, pp. 91-128.

[35] L. Hunt, *Politics, Culture, and Class in the French Revolution*, St. Martin's Press, New York 1996, p. 54.

mented by the intermingling of providential and republican ideology that occurred with the Revolution[36].

It was necessary to identify several significant differences between the American colonies and Europe and England in order to disavow the vision of Winchester and others and claim American uniqueness. One of the key themes employed was the differentiation of the work of Puritanism from the other colonial enterprises of Catholic countries. It is well documented that the Spanish and Portuguese charged their victories against the pagan natives with a religious sense. However, it was only with the advent of Puritanism that the next step was taken: the sacralisation of intervention in physical space for the conquerors, rather than evangelisation of the conquered. Spain, above all, had justified its claims on the non-Christian lands and peoples of the New Continent by a sort of papal mandate: the "mission" to protect and evangelise the indigenous inhabitants in the name of the Church of Rome. England, in turn, confronted a comparable predicament. Since the beginning, despite lacking explicit authorization from Rome, it perceived itself as similarly invested with a "providential mission," conceived in terms of a conquest in the name of an ideal of moral civilization and the re-founding of the world[37]. It is notable that in 1610, the pastor W. Crashaw delivered a sermon to the members of the Virginia Company, an English company authorised in 1606 by King James I to carry out settlements on the North American coast. In this sermon, he outlined a kind of national mission that would take place almost two centuries in advance. He stated that the English would take possession of the land and give to the indigenous peoples what they needed, namely «Christianity for their souls» and «civilisation for their land»[38]. As executors of God's will, and not the mission of his Church, the project's essence was the conquest, settlement and making of the land fruitful for the benefit of the people. The occupation of the chosen people made the land sacred. In this context, refer-

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[36] See T. Bonazzi, *La rivoluzione americana*, il Mulino, Bologna 1977.

[37] J.H. Elliott, *Imperi dell'Atlantico. America britannica e America spagnola, 1492-1830*, Einaudi, Torino 2010, p. 9.

[38] A. Brown, *The Genesis of the United Stated*, Russel & Russel, New York 1966, p. 19.

ences to conversion were quickly superseded by references to the Old Testament and the self-referentiality of the narrative of a chosen people who were not to convert, but to fulfil a mission in their ascetic isolation. This resulted in the overlap between the "visible saints" who landed in Plymouth and the Israelites. A. Stephanson has, in fact, defined American political culture as being primarily oriented around the value triad of the concepts of Election, Apostasy and Prophecy[39].

Consequently, the re-proposition of the biblical Exodus, the juxtaposition of the sea voyage with the wandering in the desert, became a constant element of comparison, a key to claiming a powerful theology of election and the keystone of the conception of self that would later inform American identity and culture. The United States was conceived as a sacred place for the fulfilment of the divine will and its corresponding secular idea of a liberated nation. This served to free the nation from the continental currents that, like Winchester and Murray, still saw England as the land of election. This "heresy", which E. Gibbon attempted to eradicate in the years preceding the War of Independence, was subsequently also vindicated by the Reverend T. Brockaway, who proposed, despite the victory and the Peace of Paris, that knowledge, glory and religion must travel even further westward, because «there God is setting the stage from which he will display the wonders of his world and his people»[40]. The messianic ideology that is often referenced did not serve to validate the claims of self-government that the colonial communes advanced (and which the British Crown conceded without significant hesitation). Instead, it constituted the very essence and, in conjunction with religious endorsement, the ultimate expression of the values of belonging that can help elucidate the support for other "chosen Peoples."

The concept of Americanism, as it emerged from the North, was therefore fundamentally rooted in the Old Testament and Israelite idea of the Divine Election. In their re-discovery of the sacred scriptures, they inherited the theme of the divine choice of people and cov-

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[39] A. Stephanson, *Manifest Destiny: American Expansion and the Empire of Right*, Hill & Wang, New York 1996, p. 28-44.

[40] C.L. Albanese, *Sons of the fathers: The civil religion of the American Revolution*, cit., p. 36.

enant. In return for this choice, the unified people, who are unable to accept differences that would taint their purity, accept the covenant, that is, they choose it, they "elect" it. If they respect either God or their status as chosen ones, He will lead them to an abundant and enemy-free corner of the earth, initiating regeneration. It is therefore evident that territory, physical space and the journey are the fundamental symbolic elements. The march in the desert and the subsequent sea journey westward, as well as the conquest of the holy city, are the elements that reveal the redemption and reconciliation that are at the heart of this narrative. The conquest of this land of plenty, destined for them, is not an end in itself. It is through the taking of Jerusalem (new or old) that divine justice will regenerate the world by bringing reconciliation to completion. The identity of the new chosen people, as of the old, is limited to this characteristic: absolute loyalty to the plan and commitment of every man to the divine mission are the only conditions required. It is evident that, due to the fallibility of humankind, this is not a foregone conclusion. The covenant can be breached by the people, who are subject to severe penalties for this. One of Reverend Smith's principal themes during the period of the "Great Awakening" was the reference to the mysticism of the Kabbalah and the narrative of the "breaking of the vessels". Smith believed that America had collected the pieces of light scattered around the world, re-proposing what Brooke, appropriating a characteristic that Yahweh gives of the Israelites, calls a "prepared people", now rebuilt by the Atlantic[41]. The history of humanity has not been characterised by a lack of preparation for reconciliation, given the long periods of apostasy and errors in the choice between good and evil. The Jews, by rejecting the Gospel, failed to recognise the path marked out by God, which enabled the early Christians to prosper until they were later corrupted by Papism. It was therefore of the utmost importance to identify the genuine word of the Lord amidst the plethora of historical misinformation. With an almost rabbinic approach, a Puritan mastered the Bible. It can be, finally, argued that no other book has enjoyed greater fame than the Apocalypse, which in the Anglican Bible, as promoted

[41] E.A. Robinson, *American universalism: its origins, organization and heritage*, Exposition Press, New York 1970, pp. 126-129.

by King James, took the name of the "Book of Revelations". Furthermore, it posited a comprehensive and finite understanding of history, encompassing a first battle, a fleeting triumph of the Lord, and, at the conclusion of the "millennium", a second battle with a decisive victory and triumph of good, the return of the Messiah to Earth, the ascension and divine judgement of the righteous and the wicked. The millennium was the final epoch before the end of time, or, as J. Milton poetically and not surprisingly described it, a "perpetual Shabbat". The Puritans, for their part, interpreted the conquest of their land and then of Jerusalem as a stepping stone to Armageddon. This is similar to the argument put forth by contemporary evangelicals, who believe that the conquest of Jerusalem by the Israelis is necessary and marks the beginning of the final battle.

Conclusions: the risk of the American identity

I commenced my reflection on this argument with a discussion of contemporary events, including the unconditional support for Israel by many American Christians, their acts of violence against Jews who participated in pro-Palestine protests in colleges, and the role of evangelists and the documentary recounting their growing influence. It is now possible to draw lines of connection, a *fil rouge*, between these observations and the events currently taking place.

Firstly, it is important to underline that universities were a significant conduit for the dissemination of American religiosity and the subsequent political outlook. This is because, unlike in Europe, there was no clear distinction between high and popular culture in the United States during the 19th century. J.Q. Adams, for instance, highlighted this in his writings for the "American Whig Review"[42]. The preaching that took place from the pulpits or directly in the street (as in the case of Whitefield) is regarded as the genesis of American culture. Furthermore, the universities, their birth, development and the religious afflatus that still characterises them today, as mentioned in the

[42] M. Schudson, *Discover the News: a social history of American Newspapers*, Basic Book, New York 1978, p. 52.

introduction, provide a useful proof of this. Higher education in the US is, in fact, inextricably linked to a religious outlook precisely because it was born out of the direct influence of the Awakening. W. Tennent's Log College would subsequently become Princeton University under the direction of his son and heir, G. Tennent. Edwards himself was president of Princeton University from 1758, becoming renowned for his weekly essay assignments in theology to the senior class. Also, in the 1730s-50s, on the initiative of pastors and on the basis of their preaching, a number of educational establishments, including Dartmouth, Brown University and Rutgers University, were established. In 1743, Franklin had a preaching hall built in Philadelphia for Whitefield predications. This hall would later become the University of Pennsylvania. Another clergyman, Reverend Peters, the author of the new "Book of Common Prayer", published in the same year as the Constitution, and rector of Christ Church, a fundamental institution for the spread of the Episcopal Church in the United States, was called to direct it.

In revivals depicted in the Al-Jazeera documentary, it is useful to refer to Pastor J. Hagee, the founder of Christians United for Israel (CUFI), and a descendant of a lineage of preachers dating back to the 1700s. At the rallies, he proceeds to discuss the Bible as an epistemic and political code, demonstrating the continued necessity of such a capacity for every true American (of which he claims to be the spokesman). The assertion that all things are a realisation or re-actualisation of the Bible is, after all, what the colonists were at pains to affirm in their constitutions. The initial legislation enacted by the colonists was, in fact, inspired by the principles of faith and based on the penal legislation of Connecticut, which included lengthy textual quotations from Deuteronomy, Exodus, and Leviticus. As de Tocqueville wrote:

They persistently penetrated the domain of conscience, and there were no sins that were not subject to the censure of the magistrate. In their ardour to impose their religious beliefs on others, they disregarded the fundamental principles of religious liberty. Those who wished to worship God in a manner different from that prescribed by the state were compelled to attend divine service and, in some cases, were punished with the whip or even death. Consequently, capital

punishment was a more frequent occurrence in the laws and was applied to those who were less culpable[43].

The documentary also depicts the thousands of ecstatic worshippers attending revivals (which are no longer held in the streets but in luxurious convention halls). In these instances, J. Hagee once more foretells the time of the final battle, he reiterates the indivisible bond between the Jewish and American people and the sacred mission entrusted to the latter by the Lord[44]. In this manner, he draws attention to a parallel that he is aware it will resonate with many Americans and which, in fact, is asserted. Similarly, when Colorado Congresswoman L. Boebert articulates comparable beliefs, namely that «there are only two nations created for the purpose of glorifying the Lord, Israel and the United States of America: I bless, honour and serve them both»; or when Pastor R. Jeffres, head of the First Church of Dallas, the renowned figurehead of the Trinity Broadcasting Network and Trump's spiritual counsellor, extols the holiness of the two distinguished chosen peoples, the objective remains consistent. The centrality of the concept of the Chosen People in American political culture means that many Americans feel compelled to take sides in favour of the other Chosen People. To do otherwise would be to risk covenant, apostasy and the loss of a significant element of American political culture. Defending Israel today is similar to defend the nation. Those who oppose those who do not support the nation's creed, as de Tocqueville called the "empire of the majority", and occupy an institution as tied to that history as the universities are, have a duty-bound to do so, since, as Cmiel specified, to say anything that questions the nature of the country and the mission «is not just bad politics: it is un-American»[45]. There is a certain parallel between the situation in Israel and the United States: in both countries there is a perception that they have a divine duty to recapture Jerusalem. This perception has led to

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[43] A. De Tocqueville, *La Democrazia in America*, cit., pp. 59-60.

[44] A. Gabbatt, *This war is prophetically significant': why US evangelical Christian's support Israel*, «The Guardian», 30-10-2023.

[45] K. Cmiel, *Democrat eloquence: The fight over popular speech in nineteenth-century America*, University of California Press, Oakland 1991, p. 28.

a certain degree of aggression from US citizens, even towards Orthodox Jews who have sided with the ceasefire, in the absence of any condemnation of Israel.

American nationalism and the claimed symbiosis with the Jews also provide an explanation for the practices and actions of some of the more than 200.000 soldiers who have been baptised into the Army today. The documentary illustrates examples of rifle sights marked with passages from the "Book of Revelations" or the Exodus, and air force units transporting nuclear devices whose logos recall the effigy of the Crusaders, the Star of David and the Temple of Solomon. Furthermore, according to former Colonel Larry Wilkerson, this now majority and indispensable component of the army also engages in tireless propaganda work in society. This is achieved through the creation of a support network for soldiers' families, training camps for the children of those abroad, prayer groups, recreational activities and alternative education systems. This constitutes a kind of army within an army that then constitutes a state within a state. For these soldiers, as well as for tens and tens of millions of other Americans, the defence of Israel is much more than a matter of foreign policy decided by a department in Washington. It is an ideological issue that has to do with the very identity and destiny of the United States and its people. As some interviewees have stated, "supporting Israel is America's destiny". It is evident that commentators and numerous scholars fail to comprehend that the subject under discussion is not limited to foreign policy and strategic goals. Rather, it concerns the identity of the United States, the nature of its mission, and the symbiotic bond between chosen peoples. In the first century of American history, this sacred vision was transposed into the political ideal of the state and the first and only modern democracy for the majority of citizens. This is analogous to the contemporary insistence on Israel being the first and only democracy in the Middle East.

It is important to recognise that collective identities and peoples are complex subjects, akin to prisms with many faces. Any historical-political study should take the Enlightenment into account, even "pagan"[46] matrices of the Founding Fathers' thought and work, as

[46] See L.L. Pellicani, *Le radici pagane dell'Europa*, Rubbettino, Soveria-Mannelli 2007.

well as the "neo-Roman" and Montesquieu thought of American republicanism[47]. Furthermore, it is necessary to consider the different conceptions of freedom held by the Founding Fathers, which can be traced back to Whig radicalism (and the tradition stemming from Cato's Letters) and the proto-libertarian conceptions of Anglo-Saxon constitutionalism, the Federalist Papers, and the proto-populism of the Jeffersonians type of autonomous farmers[48]. The objective of this text is not to make claims about the history of political thought. Rather, it attempts to apply the theory in question to contemporary events, thus "politicising" it. It is also possible to argue that the simplicity and immediacy of these Old Testament assumptions, the exaltation of a people as a totality descended from the signing of a Divine Covenant, thus claiming an ancestral and unquestionable legitimacy, were necessary because they have easier and more useful to include, at least ideally, large masses of citizens in the management of power and above all in the idea of a manifest and common destiny of the Republic. In a certain sense, if compared to the complexity of all the other references, it proved to be a "forced choice" for the US.

However, as Liberman et al. observed two decades ago in reference to another conflict in the Middle East, the potential risks associated with a close association with a historical legacy that has been sanctified over an even more distant past are considerable. Rather than questioning these assumptions, the answer lies in worshipping and invoking them more and more, as is well demonstrated by the radicalisation of evangelists and by the US public debate. Furthermore, there is a strong demand that political representatives should adopt a similar approach, as Trump campaigns exemplified. However, this will not actually resolve the issues and may, in fact, exacerbate them, both in foreign and domestic policy. Consequently, citizens will be further ex-

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[47] See J.G.A. Pocock, *The Machiavellian Moment. Florentine Political Thought and the Atlantic Republican Tradition*, Princeton University Press, Princeton 1975; E.L. McKitrick, S.M. Elkins, *The Age of Federalism: The Early American Republic, 1788-1800*, Oxford University Press, Oxford 1995; T. Skocpol, *Diminished Democracy: From Membership to Management in American Civic Life*, University of Oklahoma Press, Norman 2003.

[48] M. Kazin, *The Populist Persuasion: An American history*, Cornell University Press, New York 2017.

asperated. This also gives rise to the idea that if the republic is to decline further, it will undoubtedly be because there is a group of enemies who are attempting to thwart the efforts of a virtuous people who are striving for conciliation. Consequently, «instead of thinking to innovate, Americans rely on their patriarchs, their founding fathers to think for them by taking refuge in the pre-modern past»[49], a vicious cycle from which there is no escape, and which risks becoming an example of self-fulfilling prophecy, in a manner similar to the evangelist groups that "Pray for Armageddon".

[49] D. Lazare, *Due Secoli di semi-immobilismo. La Paranoia Costituzionale contro la Sovranità Popolare*, in J. Liberman, *Quale Democrazia Americana?*, cit., pp. 45-58.

Libri consigliati

Francesca Fariello, Luigi Gallo

Alessandro Magno, eroe dei due mondi. La storia, le fonti l'archeologia e il mito
Le Monnier Università, Firenze 2023, pp. 264, 22,00 euro

The bibliography on the extraordinary figure of Alexander the Great is endless and interest in him has never waned over the centuries. On the contrary, his story continues to exert an unceasing fascination on the collective imagination. Thus, the risk any scholar runs in tackling a study on this figure is that of running into unoriginal and innovative repetitions. A danger that, however, does not touch the brilliant work of Luigi Gallo and Francesca Fariello, co-authors of *Alessandro Magno, eroe dei due mondi. La storia, le fonti, l'archeologia e il mito*, published by Le Monnier Università. This text, in fact, sets out to offer something different from the many volumes in circulation: it dwells on the problematic and controversial issues of the historical event featuring Alexander as its protagonist, but also takes a careful and systemic look at other themes that are usually the subject of specific and separate works. The essay, in fact, focuses on the literary tradition with the relative fortune that the son of Philip the Macedonian had in the Western Middle Ages; it investigates the historical figure through epigraphic documentation, both through the inscriptions found in the West and those from the East; it plumbs the archaeological and numismatic evidence with particular attention to the modes of iconographic self-representation of the Macedonian sovereign and

the representation that image had in subsequent periods; and it does not neglect the "mythological" question: the interest of the investigation is in fact also the ways in which the myth of Alexandros spread widely in the West, in the East, and even in distant areas that had not been touched by his conquests, such as China or Mongolia. A true hero of two worlds. Hence the decision to devote a large part of the research to his fortune in various cultural spheres of the East, both in already frequently investigated traditions such as the Arabic and Persian, and in lesser-known regions of the Far East such as Mongolia and China.

The first chapter that Professor Gallo has dealt with concerns, as we said, the historical events: the ascent to the throne, the first years of the kingdom, the expedition to Asia Minor, Phoenicia and Egypt, the clash with Darius III at the battle of Issus and then the decisive battle of Gaugamela, up to the arrival in Persepolis. But the interest of the study also turns to the end of the Achaemenid dynasty, the figure of Philota, and the plan to continue on to India with the consequent Macedonian mutiny and later the too premature end of the ruler. The second chapter deals with the literary tradition, focusing on the works, both those that have come down to us and those that have not, and on the romance tradition in the West. The third chapter deals with Greek and Eastern epigraphic works. The fourth chapter begins with the narrative of Francesca Fariello, who engages her research on archaeological evidence with a focus on Egyptian permanence. The fifth chapter examines the Syrian and Ethiopian sources, the presence of Alexander in the Koran and the Zoroastrian tradition, and then the Chinese and Mongolian sources. The sixth and final chapter discusses the myth of Alexander between past, present and, above all, future, passing through classical music, Rock, Heavy and cinematographic representations. In short, a rich and up-to-date work that offers a new overview and is a useful summary tool on the history and myth of this fascinating and "immortal" character named Alexander.

Leonardo Masone

Note biografiche

Alessandro D'Oronzo
Dottorando in Storia della Scienza nel contesto del corso in "Patrimoni storici e filosofici per una innovazione sostenibile" presso l'Università degli Studi di Bari "Aldo Moro", ha concluso il master di II Livello in Intelligenza Artificiale per le scienze umane presso l'Università degli Studi di Napoli "Federico II".

Pasquale Grieco
Dottorando in Storia della Scienza per il curriculum filosofico del dottorato in "Patrimoni storici e filosofici per una innovazione sostenibile" presso L'Università di Bari "Aldo Moro" e docente di filosofia e storia al Liceo Scientifico "G. Tarantino" di Gravina in Puglia (BA). Il suo ambito di ricerca è l'etica e l'epistemologia del digitale e delle ICT e la filosofia dell'interazione uomo-macchina e dell'AI.

Eléna Grobler
Laureata in Innovazioni per le produzioni agrarie mediterranee presso l'Università degli studi di Salerno, è ora dottoranda all'Università della Basilicata in scienze agrarie, forestali e degli alimenti con tematica agricoltura digitale e di precisione.

Paola Manes
Professore ordinario di Diritto privato nell'Università di Bologna, dove insegna diritto privato, Insurance Financial Law and Esg, Artificial Intelligence in Medicine and Medical Education. Insegna inoltre in vari master, tra i quali si segnala Law and Tech al Master in Finance and Fintech presso la Bologna Business School. È Lecturer pres-

so la School of law, King's College Londra, nell'ambito dell'LLM in Banking and Finance, Institute for Commercial Studies, Queen Mary University London, presso l'IE University, Madrid, Segovia, Spagna, nonchè visiting Professor alla Brunel University London. È autrice di numerosi articoli e monografie in materia di diritto comparato, diritto societario, corporate governance, diritto assicurativo, diritto dei trust e diritto successorio. È altresì componente del comitato scientifico del CEDE, Centre for Digital Ethics, Università di Bologna; membro del comitato di redazione delle riviste «Contratto e Impresa» e «Contratto e Impresa Europa»; vice direttore e componente del comitato scientifico della rivista «Trusts e attività fiduciarie in rete»; referee della rivista «Famiglia e diritto».

Leonardo Masone

PhD in Filologia Classica all'Università "Carlos III" di Madrid, è ora al suo secondo dottorato in "Patrimoni storici e filosofici", all'Università degli Studi di Bari. Si occupa di pensiero politico classico e in particolar modo delle *Leggi* di Platone, ma si è dedicato anche al rapporto tra arte e politica nell'età moderna, con la pubblicazione della monografia *L'Accademia e i manuali del Guercino. Saggio di storie dell'arte, teoria dell'immagine e simbolica politica*, per L'Erma di Bretschneider, e di alcune femministe del Novecento italiano come Marisa Rodano.

Dan Mcquillan

Docente di Creative and Social Computing all'Università di Londra. Ha una laurea in fisica a Oxford e un dottorato di ricerca in fisica sperimentale delle particelle all'Imperial College di Londra. Dopo il dottorato è stato un assistente sociale per persone con disabilità intellettive e ha fatto volontariato come sostenitore della salute mentale, informando le persone in detenzione psichiatrica sui loro diritti. È autore di numerosissimi saggi sul tema dell'AI.

Silvano Poli

Silvano Poli è Visiting Fellow dell'University of Essex, PhD Candidate presso l'Università degli Studi di Catania e membro del CIDA (Centre for Ideology and Discourse Analysis). I suoi interessi di ri-

cerca includono la teoria politica empirica, la discorsività ideologica e lo studio della politicizzazione del XIX secolo. Ha pubblicato diversi contributi in volumi e riviste scientifiche.

Antonio Scoppettuolo

Dottore di ricerca in Scienze filosofiche, è stato docente a contratto di Etica sociale presso l'Università Suor Orsola Benincasa, attualmente cultore della materia in Filosofia morale presso l'Università degli Studi di Roma "Tor Vergata", membro della *Irish Philosophical Society* e membro dell'Osservatorio sulla Legalità dell'Istituto di Studi Politici "S. Pio V" di Roma. Tra le principali pubblicazioni vanno menzionate: *Etica economica e teoria dell'azione: ragione, individuo e società in Raymond Boudon*, Rubbettino, Soveria Mannelli, 2010, oltre a diversi saggi e articoli di Filosofia morale, bioetica e intorno al rapporto tra diritto e morale in riviste scientifiche.

Sebastiano Taccola

Dottore di ricerca in "Culture e società dell'Europa contemporanea" presso la Scuola Normale Superiore di Pisa. Si occupa di tematiche afferenti al marxismo, alla teoria critica, alla filosofia della storia, alla marxiana critica dell'economia politica. Ha pubblicato la monografia *Categorie marxiste e storiografia del mondo antico. Critica e storia in un dibattito italiano degli anni Settanta* (Manifestolibri 2022).

Marta Vitale

Laureata in Scienze dell'Educazione e specializzata in Scienze Pedagogiche, sta proseguendo gli studi in processi cognitivi e tecnologie ed ha concluso un master di II Livello in Intelligenza Artificiale per le Scienze Umane presso l'Università degli Studi di Napoli "Federico II".

Candido Volpe

Avvocato, Dottore di ricerca presso l'Università Vanvitelli. Svolge le funzioni di Dirigente Amministrativo presso l'Asl di Salerno. Ha svolto attività didattica e di ricerca presso l'Università Suor Orsola Benincasa, sede di Salerno, in maniera ininterrotta e continuativa dal 2006 fino al 2015. È stato segretario comunale e ha ricoperto l'incari-

co di avvocato e responsabile del servizio avvocatura per il Comune di Bellizzi e l'Amministrazione Provinciale di Benevento, oltre ad aver svolto le funzioni di vicesegretario e responsabile di Settore presso i Comuni di Agropoli e Montecorvino Pugliano. È autore di numerosi saggi e pubblicazioni.

Ivano Zanzarella

Dottorando in Storia e Filosofia della Scienza presso l'Università degli Studi di Bari/Università di Barcellona, nonché membro del Seminario di Storia della Scienza (UniBa). Si occupa attualmente di epistemologia della robotica umanoide, con ulteriori interessi di ricerca storico-filosofici riguardanti le intersezioni tra musica e scienza, il concetto di comprensione scientifica e l'oggettività nelle scienze acustiche.

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