

Kompleksnost, literatura, znanost: o diskurzu in dialogu

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Globlji vpogled v zapleten poetološki sistem modernizma, obdobja, ki se je izgrajevalo v ključnih historičnih prelomih, nanovo valoriziralo vlogo jezika in odkrilo ključen pomen gledišča v literaturi ali slikarstvu, pa tudi v znanosti (prim. Heisenberg), pomika vlogo humanistike v novo osvetljavo, tako da ne preseneča, da so jo v ponovnem pretresu znanosti kot enega od petih konkretnih kontekstov za novo produkcijo znanja in za uspešnost znanstvenih politik izpostavljali tudi v epistemoloških predpostavkah (Nowotny idr.). Literatura je vitalen segment žive pojavnosti in branja so neposreden izziv človeške autopoetske adaptacije in identitetnega prevpraševanja. Razprava se osredotoča na dvojje temeljnih svojstev, na autopoiesis in njen smisel v poiesis, ter na potencial, ki ga imajo besedila v kompleksni življenjski dinamiki.

Ključne besede: literatura / humanistika / znanost / jezik in zavest / modernizem / samoreferenčnost / samorefleksivnost / dialog / Maturana, Humberto R. / Heisenberg, Werner / Jakobson, Roman / Lotman, Juri / Thibault, Paul J. / Nowotny, Helga

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Jezik je bil past, ampak vsa izkušnja je bila čudovita šola, v kateri je bilo mogoče odkriti, kako je bil kdo nem, gluhi in slepi. Preprosto je biti ujet v lasten ego, pa vendar, če komu uspe doseči vsaj neko stopnjo osvoboditve iz tega, začne poslušati in njegov jezik se začne spreminjati: le tako je potem mogoče izreči nove stvari.

(Maturana o svoji izkušnji maja 1968, ko je čilska univerza vstopila v revolucionarne razmere, Maturana in Varela: xvi)

Tehnologija je [...] čudna stvar. Z eno roko prinaša darila, z drugo pa te zabode v hrbet.

(C.P. Snow, *New York Times*, 15. marec 1971)

Znanosti in umetnosti so inventivne instance, ki potrjujejo in porajajo potencialne človeškega mišljenja skozi zgodovino in podeljujejo moč novim pomenom. *Transgresivno mišljenje in transgresivna kompetenca*¹ sta učinkovito obsežena v obeh, prav tako kot sta vpletena v procese kateregakoli pisanja

in procesa branja. Področja umetnosti in literature predstavljajo podobno kakor znanosti del človeškega kapitala. Vsak diskurz, pa naj bo literaren ali znanstven, nas zapleta v transgresivne² operacije; pravzaprav odpira problematiko *transgresivne kognicije* (Perkins). Mark Turner celo trdi, da je »um v svojem bistvu literaren« (5) in da je »pripovedna domišljija – zgodba – temeljni instrument misli« (4).³ Takšna stališča nas nagovarjajo ne le k premisleku temeljnih nalog, ki jih ima lahko humanistika v prihajajoči družbi znanja, ampak nas hkrati silijo k temu, da poskrbimo za bolj precizne vpogleda (in na novo razdelane pojme, da posežemo) v bistvene prvine realnosti sveta in človeka. Vrsta epistemoloških idej izpostavljenih in izčrpano razčlenjenih pri Maturani in Vareli ter pri Nowotnyjevi je spodbudila in podprla moja nedavna razmišljanja o kompleksnosti, literaturi in znanostih.

Tihi dialog med različnima metodološkima tradicijama – *dveh kultur*⁴ (v pomenu dobro znanega predavanja C. P. Snowa iz leta 1959) – in čvrsta vzajemna igra znanosti, literature in humanistike sta odmevala že v zgodnjih modernističnih premikih v umetnosti ter spodbujala k kompleksnejšim prijemom in izraznim načinom za zajemanje dejstev o svetu ter človekovem bivanju v njuni *zaučasn* resničnosti, pa tudi za podajanje samih faset *konflikt*a in *protislovja*. Modernistična umetnost je bila pravzaprav zmožna v svoje postopke vgrajevati in izraziti ta latentni dialog. Navidez obrobno pripombo Nowotnyjeve, izrečeno v pogovoru s Hansom Ulrichom Obriestom (gl. Obrist), »da se vmesniki [*interface*] pogosto začnejo pojavljati zaradi kontroverz«, torej o tem, da obstajajo nasprotnosti oziroma spornosti, je tu vredno omeniti, ker nakazuje boljše razumevanje, kaj leži v ozadju modernističnih preoblikovanj. Modernistična umetnost dejansko promovira (in skozi umetniške postopke tematizira) resnico kot *postajanje* (gl. Škulj, »Landscape«). Za modernističnimi matricami, (ki naznačujejo značaj kompleksnosti, kaosa, modeliranja, »mreženja« itn.), lahko prepoznamo sistem vednosti, ki manifestira določene tendence premagovanja binarizma (kot logike izključevanja⁵). Od tod naraščajoči interes za *tropološke* prikaze, ki jih najdemo v modernističnih novih umetniških obrazcih ter v znanstvenih preobratih tistega časa; oboje lahko prepoznamo kot ustvarjalni odziv *mislečega uma*⁶ v zgodnjem 20. stoletju. Takšne težnje, ki ležijo pod površjem umetnosti in znanosti, so ob prelomu preteklega stoletja, nakazovale zgodnje napovedi, da je to, kar se dogaja, preobrat od disciplinarnega načina produkcije znanja v bolj transdisciplinarno, ki zaposluje *skopičen vpogled* (Spivak) ali dvojno-usmerjen vidik predstavljanja, in se zaveda, da je vloga *opazovalca del opisovanega pojava* (Maturana). To je očitno rezultiralo v preboju *transgresivnega mišljenja* v sodobnih tokovih znanosti in v znanstvenih politikah.⁷ V intervjuju z Obriestom se je Nowotnyjeva zavzela za idejo, da »stvari prezentiramo vizualno« – ker »videnje« in »po-

doba« odpirata drugačne ustvarjalne prostore – in lahko tako zaobjamemo *dinamično* vednost, samo problematiko (nerazrešenost) v procesu (Obrist).⁸ Kot močna zagovornica kontekstualizirane vednosti in promotor ideje o odmiku od *zanesljive* vednosti⁹ – ta je prenehala biti definirana v univerzalističnem smislu in je postala zavezana posamičnemu kontekstu – k *družbeno robustni vednosti*, zagovarja transformacijo znanosti globoko v njenem epistemološkem jedru. Njen koncept

družbene robustnosti je relacijski, ne relativističen ali (še manj) absolutna ideja. [...] družbena robustnost je v pomembnem smislu *prospektivna* [takšna, ki predvideva]; zmožna se je ukvarjati z neznanimi in neslutnimi konteksti. [...] [I]n navsezadnje, družbeno robustna vednost ima močno empirično dimenzijo; je predmet pogostega testiranja, povratne informacije in izboljšav, ker je nekaj *nedovršenega*. (Nowotny, Scott in Gibbons, *Re-Thinking Science* 167)

Njen raziskovalni kredo je razkrit v misli Roberta Musila, citirani v intervjuju: *je gibanje, ki je podprto z občutkom možnega*. Modernistično dispozicijo je v tem besedišču prav lahko razpoznati. Modernistična matrica,¹⁰ ki je, kot je v kasnejšem dunajskem predavanju komentiral Husserl, odgovor na krizo zavesti, je nedvomno spodbudna. Občutljiva za kompleksnost in »človeški faktor«, je ta umetnost sprožala nove uvide v realnostne principe. Prav tako je ustvarjala mnogo bolj dialoški odziv človekovega samorazumevanja. Na vrhuncu modernizma se je tudi znanost sama začela zavdati pomembnosti ubeseditvene vloge jezika, kot je to komentiral Werner Heisenberg, Vpliv posaussurovskih pojmovanj je precej očiten.

Komunikacija prek institucionalnih meja lahko nudi svež zagon veljavnim, tehtno utemeljenim in odgovornim raziskovalnim interesom. Literarne raziskave lahko zaradi svojih teoretskih in metodoloških pomikov ter konceptualnih teritorijev resno prispevajo k novi produkciji vednosti v transdisciplinarnih pristopih.

Možno je spomniti na vzorčni primer vrednega dialoga med literarnimi vedami in »trdo« znanostjo. Ko je komentiral zgodnejše temeljne poglede Humberta Maturane na *Biologijo kognicije* (1970), je njegov mlajši raziskovalni sodelavec Francisco J. Varela, ki je skupaj z njim napisal ključno knjigo *Autopoietičnost in kognicija: Uresničenje živega* (1972), pripomnil: »Če zares krožna organizacija zadošča za okarakteriziranje živih sistemov kot enot, potem bi bilo to mogoče izraziti tudi z bolj formalnimi sredstvi.« (Maturana in Varela xvii) Pojem *autopoiesis*, ki sta ga uvedla, da bi z njim poimenovala »dinamično avtonomijo, lastno živim sistemom« (xvii), se nanaša na krožno organizacijo ali samoreferencialni sistem kot ključni koncept za razumevanja organizacije živih sistemov. Oznaka ima svojo predzgodovino v literarni vedi, četudi se Maturana, ki v uvodu zapiše o

tem, kako je prišel do svoje konceptualne iniciative, pravzaprav ni zavedal pogosto omenjene strukturalistične ideje o *samoreferencialnosti*, *nase se nanašajočem sporočilu* ali o *rekurzivni referenci in korolarnih potezah poezije*, o čemer je razpravljal Jakobson (370–371), tj. o temeljnem organizacijskem principu *poetske funkcije*, kot je bila izčrpno premišljena v semiotskih razpravljanjih o literaturi.¹¹ Maturana je ponudil naslednjo razlago o moči besede »poiesis«, na rabo katere je povsem po naključju naletel v literarnih študijah.

Bili smo nezadovoljni z izrazom »krožna organizacija« in iskali smo besedo, ki bi sama izrazila osrednjo potezo organizacije živega, ki je avtonomija. V takšnih okoliščinah sem nekega dne, ko sem se pogovarjal s prijateljem (Joséjem Bulnesom) o njegovem esaju o *Don Kihotu iz Manče*, v katerem je analiziral don Kihotovo dilemo, ali naj sledi pot orožja (*praxis*, akcija) ali poti črke (*poiesis*, ustvarjanje, produkcija), in njegovo slučajno izbiro poti *praxis* [akcije], odlagajoč sleherni preizkus s *poiesis*, prvič razumel moč besede »poiesis« in iznašel besedo, ki smo jo potrebovali: *autopoiesis*. To je bila beseda brez zgodovine, beseda, ki bi lahko neposredno pomenila, kar se dogaja v sami avtonomiji živih sistemov. Nenavadno, pa vendarle ne presenetljivo, se je iznajdba te besede izkazala, da ima veliko vrednost. Izjemno je poenostavila težavne naloge govorjenja o organizaciji živega, ne da bi padel v vedno razprto past in ne rekel ničesar novega, ker bi jezik tega ne dopuščal. Ni mogoče zbežati iz potopljenosti v tradicijo, toda z ustreznim jezikom se lahko orientiramo drugače in morda iz nove perspektive generiramo novo tradicijo. (Maturana in Varela xvii)

Citat nas opozarja ne le, kako se znanost, literatura in humanistika morda utegnejo v presečiščih vzajemno soočati, ampak predvsem, kako elegantno in preprosto je lahko svet in živa bitja v njem zajeti v integriranem pogledu na znanje. Maturanova raba termina *autopoiesis* ponazarja, kako deliti in ponovno uporabiti relevantno znanje. Ali bi lahko rekli, da sta semiotika literature in fenomenologija živih sistemov globoko v svojem epistemološkem jedru mnogo bolj medsebojno povezani, kot pa si običajno domišljamo oziroma dopuščamo? Pritrdilen odgovor nedvomno namiguje na neizogibno vpletanje naše historične eksistence.

Autopoiesis dobesedno pomeni »samokreacija« (gr. *auto*, »sam«; *poiesis*, »ustvaritev, produkcija«) – in po razlagi slovarja *Babylon* – implicira »proces, po katerem se organizem ali organizacija sama proizvaja s ponavljanjem reprodukcijskega procesa in se konstantno rekreira (/ponovno vzpostavlja/kakor celice ali organizmi)«. Ujemajoč pogled na *korolarni* ali *nase se nanašajoč* znak v pesniškem sporočilu kot bistveni element literarnega diskurza je v literarni vedi krožil od zgodnjih razpravljanj praškega lingvističnega kroga (Mukařovskij, Jakobson) sredi tridesetih let 20. stoletja. Ko je razčlenjeval koncepcijo nase usmerjenega ali *refleksivnega* [sebe razmišljajočega] poetičnega sporočila, je Jakobson v *Sklepnem poročilu* na simpoziju o lingvistiki in

poetiki v poznih petdeseti letih izjavil: »[P]oetičnost ni dopolnilo diskurza z re-toričnim okraševanjem, ampak celovito prevrednotenje diskurza in slehernih nje-govih komponent.« (377; poud. J. Š.) Semantični problem se pokaže, da je v svojem bistvu strukturna zadeva, ki označuje bistveni značaj ali organiza-cijski princip literarnega, samo razločevalno specifično verbalne umetnosti.

Modernistične invencije so sprožale, kot je bilo že večkrat ugotovlje-no, poglaviten razcvet obsežnih teoretskih razpravljanj o literarnih pojavih (ruski OPOJAZ, tj. *Obščestvo izučeniya POètičeskogo JAZyka*, Bahtinov krog, praški lingvistični krožek, Ingardnova literarna fenomenologija, novo kri-tištvo, strukturalizem itn.) in naposled spodbudile začetne korake k semi-otskemu preučevanju literature in umetnosti. Prelomni Saussurevi lingvi-stični pogledi so botrovali temeljitemu prevpraševanju sistemskih parame-trov literature in besedilnosti in v obtok je prišla ideja literarne znanosti (nem. *Literaturwissenschaft*), besedna zveza, ki jo mnogokrat zasledimo tudi pri Jakobsonu in kasneje pri Lotmanu. Literatura, ki je manifestirana v materialnosti jezika, je bila prepoznana kot kompleksen,¹² precej rafiniran raziskovalni predmet. Vendar je ravno ta kompleksnost odpirala vztrajen interes za dojetanje temeljnih vprašanj, kot so, kaj je literatura, zakaj ob-stajajo literarni pojavi, kako naj identificiramo jedro njene literarnosti (tj. *poetičnosti* v Jakobsonovem smislu), kako naj razjasnimo njen modus eksis-tence. Zgodovinski zaris pomikov v teoretskih razmišljanjih o literaturi v preteklem stoletju nudi presenetljivo podobo.

Modernistični preboj se je dogodil kot rezultat mnogih kriz – jezika, kulture (Beebe, Bradbury in McFarlane, Calinescu, Luft) ter subjekta (jaza) ali identitete (Le Rider). V dveh svojih zgodnejših objavljenih razpravah (Škulj, »Landscape«; Škulj, »Modernizem«) sem problematiko razložila v kontekstu Husserlovih izpeljav o krizi evropske zavesti. Modernizem je bil nedvomno manifestativna kriza reprezentacijskih modusov. Njegovi kompleksni poetološki obrazci ter na novo izumljen model narativnosti z vpisom bralca (gledalca, opazovalca) v ustroj pojasnjujejo modernistično zavedanje o *vlogi konstrukcijskega dejanja* v bralnem procesu. Semioza je mi-krokozmos človeškega dejavnika in zavesti (prim. Thibault). Modernistične invencije v poeziji ali romanu se ukvarjajo s samimi območji reinterpretiranih identitet.

Istočasno je jezik postal neizbežno vprašanje v »trdih« znanostih in pri Heisenbergu najdemo spoštovanja vredno pripombo, da se same be-sede, ki se nanašajo na opis atomske ravni, izkažejo za problematične. Zavedajoč se vloge jezika, je zapisal:

Kvantna mehanika nam je naložila celo še bolj resne zahteve. Morali bi se v celoti odreči objektivnemu opisu narave – v Newtonovem smislu, po katerem se defi-nitivne pomene pripisuje tako bazičnim navzočnostim v sistemu, kot so prostor,

hitrost, energija; in namesto tega bi morali beležiti deskripcijo opazovalnih točk, zanje pa so edina gotovost verjetnosti nekaj rezultatov. Same besede, uporabljene pri opisu atomske ravnji, se potem izkažejo za problematične. Lahko govorimo o valovanih in delcih, pri čemer si moramo zapomniti, da se ne ukvarjamo z dualističnim, ampak s povsem v enoto spojenim opisom fenomenov. *Pomen starih besed je izgubil preciznost.* (Heisenberg, *Schritte über Grenzen*; nav. po Lotman 270)

V svoji semiotski teoriji kulture ima Lotman (269) daljnosežno pripombo, da »vprašanje jezika zadeva vse znanosti« in nas spomni na spremembe v moderni znanosti. Trdi, da se je ta

oddaljila od naivnega pogleda, po katerem smo običajne metode zaznavanja in posploševanja podatkov imeli za veljavne, in je bil problem pozicije tistega, ki opisuje, v odnosu do sveta, ki je opisan, komajda upoštevan; odmaknila se je stran od stališč, po katerih je znanstvenik gledal realnost »s pozicije resnice«, v svet relativnosti. (270)

Mit znanstvenika kot zunanjšega opazovalca in zanesljive »objektivne« vednosti se je tako sesul. Troje poudarkov v Heisenbergovem citatu je bistvenih za moderno znanost. Prvič, znanost mora vključiti »opis opazovalnih točk«; drugič, »edine gotovosti so verjetnosti«, in tretjič, »nimamo opravka z dualističnim, ampak s povsem v enoto spojenim opisom fenomenov«. Še najpomembnejše pa je, da »moderna znanost od nuklearne fizike do lingvistike vidi znanstvenika kot znotraj sveta, ki je opisan, in kot del tistega sveta« (Lotman 270).

Pri Maturani je mogoče najti podobne izjave. Ko opozarja na kognitivno funkcijo opazovalca, poudarja svoje globoko zavedanje o vlogi jezika v znanosti: »Vse, kar je izrečeno, izreče opazovalec. V svojem diskurzu opazovalec govori drugemu opazovalcu, kar bi lahko bil tudi on sam. [...] Opazovalec je človeško bitje, torej živ sistem, in vse, kar se nanaša na živa bitja, se nanaša tudi nanj.« (Maturana in Varela 8; poud. J.Š.) »Opazovalec je živ sistem in razumevanje kognicije kot biološkega pojava mora upoštevati opazovalca in njegovo vlogo v njem.« (9) Maturanova misel o vlogi opazovalca v znanstvenem diskurzu, kakor da »govori drugemu opazovalcu, ki bi bil lahko tudi on sam«, je v soglasju z Lotmanovo pozicijo, da sta »predmet in opazovalec po pravilu opisana v različnih jezikih, in je potemtakem problem prevajanja univerzalna znanstvena naloga«. Lotman (270) nas v nadaljevanju spomni na Platona, ki je »definiral misel kot dialog duše s seboj, [vendar] je domneval, da naj bi bil pogovor izpeljan v enem jeziku«. Dandanes se semiotika zaveda dejavne vloge subjekta (jaza) in njegove povezanosti z zavestjo.¹³ In ker subjektu (jazu) pripisujemo, da ima narativno identiteto (Ricoeur), se njegov fluiden, vedno spremenljiv, odgovornostni faktor nenehno vpisuje v rabo jezika in v vsak označevalni akt.

Maturana (9) zatrjuje, da »opazovalec istočasno opaža entiteto, ki jo preučuje (organizem, v našem primeru), in univerzum, v katerem leži (okolje organizma). To mu omogoča, da neodvisno vzajemno deluje z obema ter da ima interakcije, ki so nujno zunaj domene interakcij opazovane entitete«. Thibault (2–3) nas v svojem uvodnem poglavju opomni, da je drugost prvobitna prava vrednost, ki motivira odnos jaz-drugi in dejavnost upomenjenja.

Dialoški proces ima tako tudi povsem jasen učinek v predstavljanju znanstvene vednosti. Pojasnjevalna izjava o znanstvenih dejstvih je opazovalčev *konstrukt* kot kompleksna obsežnost, oblikovana iz številnih raziskanih aspektov; ta izjava vpleta tudi opazovalčev kod, njegovo lastno kompleksno in heterogeno podobo sveta. Sodba o znanstvenih dejstvih je rezultat pripravljalne analize. Ustvari (izzove oziroma prikljče) jo tisti, ki opazuje/raziskuje v raziskovalnem procesu, in ni nikoli kaj absolutnega. Dejstvo je relativno (resnično do določene stopnje) in njegovo razumevanje je v Lotmanovem smislu *prevod*. Takšna ideja razumevanja kot *prevoda* priznava raziskovalčevo navzočnost – *interferenco mislečega bitja, interferenco ustvarjalne zavesti* (Lotman 233) – in zavedanje »kako ta navzočnost prizadene opis« (Lotman 271).

Ko upoštevamo Lotmanove komentarje o vlogi prevajanja v razumevanju, je prav, da v zaključku citiramo še dva odlomka o novi paradigmi produkcije znanja »Mode 2«, ki razkrivata pozicijo, kakršna pušča za seboj tip vednosti »Mode 1« – »okarakteriziran s hegemonijo teoretične ali, v vsakem primeru, eksperimentalne znanosti« (Nowotny, Scott in Gibbons, »'Mode 2' Revisited« 179). Prvi citat se nanaša na *refleksivnost* in *dialoški proces*, medtem ko drugi opozarja na *vlogo humanistike* v produkciji znanja. Argumenti za eno od karakteristik novega modusa znanosti in enega od konkretnih kontekstov znanosti dajejo močno podporo tukajšnjemu razpravljanju.

Četrta značilnost vednosti »Mode 2« je, da je *izjemno refleksivno*. Raziskovalnega procesa ne moremo več označiti kot »objektivno« raziskovanje naravnega (ali družbenega) sveta, ali kot hladno in redukcioniistično prevpraševanje arbitrarno definiranih »drugosti«. Namesto tega nastaja *dialoški proces*, intenziven (in morda brezkončen) »pogovor« med raziskovalnimi udeleženci in raziskovalnimi predmeti – do takšne mere, da je temeljni besednjak raziskovanja (kdo, komu, kaj, kako) v nevarnosti, da izgubi pomenljivost. Rezultat tega je, da morajo tradicionalni pojmi »odgovornosti« postati korenito revidirani. Konsekvenc novega znanja (predvidljivih in nehotenih) ne moremo smatrati, kot da so »zunaj« raziskovalnega procesa, ker okoliščine problema, ki ga raziskujemo, vplivajo na izbiro obravnave in raziskovalni zaris, pa tudi na končne rabe. (Nowotny, Scott in Gibbons, »'Mode 2' Revisited« 187; poud. J.Š.)

Ko Nowotnyjeva s soavtorji razpravlja o specifičnih kontekstih sodobnih znanosti, komercializaciji raziskovanja, razvoju masovnega visokega

izobraževanja, globalizaciji, potencialu preoblikovanja institucij in upravljanju znanja »Mode 2«, se zdi, da je najpomembnejše, da je izpostavila vlogo humanistike.

Tretji kontekst je bila *vloga humanistike* v produkciji znanja. Za ustaljen pogled so humanistične vede najbolj nepristranske discipline, najbolj odmaknjene od nadlog aplikacije in kontekstualizacije. Njihove »rabe« so skoraj povsem ponotranjene. Naše mnenje v knjigi *Nova produkcija znanja* spodbija takšno stališče. Namesto tega vidimo humanistiko kot *najbolj angažirano* med vsemi disciplinami, ne le zato, ker udejanja pretakanje v kulturno industrijo (na primer skozi romane in popularno zgodovino), ampak zato, ker z lahkoto (in nepreklicno) uteleša *pojme refleksivnosti*, do katerih so naravoslovne in celo družbene znanosti nezaupljive. (Nowotny, Scott in Gibbons, »Mode 2' Revisited« 188; poud. J.Š.)

Skozi omenjene komentarje je mogoče na kompleksnosti, ki so inherentne literaturi, in na presenetljive kvalitete, zanimive in privlačne, da pritegujejo misel ter literarne vede nagovarjajo k raziskovanju, pogledati skozi drug zorni kot. Če izhajamo iz pogledov Maturane in Nowotnyjeve, so literarne vede dragocena komponenta nove produkcije znanja. Dialog in vzajemno razumevanje »dveh kultur« – odkrivajoč potenciale, zakopane v skupno paradigmo preiskovanj, kot so ideja kompleksnosti, ustvarjalnega, »mreženja«, človeškega faktorja, pa tudi sistem, avtopoetičnost, samoreferenčnost, samorefleksivnost, narativizacija, fokalizacija itn. – nazorno utemeljuje potrebo po *integrirani* vednosti, istočasno pa tudi potrjujejo, zakaj je bil obsežen vseevropski projekt ACUME 2, ki je soočal poglede »trdih« znanosti, literature in humanistike dragocen korak k novi produkciji vednosti, saj je naš smisel *binanja* in naša človeška pogojenost po pravilu vedno vpisana v katerokoli spoznavanje.

OPOMBE

¹ Pojme najdemo pri Helgi Nowotny (»Transgressive«), ki je razpravljala tudi o »Potencialu transdisciplinarnosti« kot eni od karakteristik t. i. »Mode 2« produkcije znanja in ki je soavtorica dveh temeljnih knjig *The New Production of Knowledge* (1994) in *Re-Thinking Science* (2001).

² »Transgresija meje se nanaša na mentalne poteze, ki prečkajo meje preteklih praks in konvencij in na nepričakovane načine povezujejo skupaj akademske discipline tako, da redefiniirajo ne le načine, ampak pogosto sam problem ter izzivajo ustaljena prepričanja o mejah možnega.« (*Invention 9*)

³ Literarni um po Turnerju (4–5) ni kaj postranskega, ampak je za misel nekaj temeljnega. Zatrjuje, da je sam *jezik otrok literarnega uma*. »Pripovedna domišljija – zgodba – je temeljni instrument misli. Umska kapaciteta je odvisna od nje. [...] Literarna sposobnost je nepogrešljiva za človeško kognicijo na sploh. Je prvobiten način, v katerem je um pravzaprav literaren.«

⁴ *Two Cultures* je naslov vplivnega predavanja znanstvenika in romanopisca C. P. Snowa z britanske univerze Cambridge (gl. Snow). V njem je Snow poudaril, da ukinjena možnost komunikacije med »dvema kulturama« – znanostmi in humanistiko – predstavlja v moderni družbi največjo oviro za razreševanje svetovnih problemov. Kot usposobljen znanstvenik, ki je bil hkrati uspešen pisatelj, je bil Snow pravi človek za zastavitev takšnega vprašanja. Oznaka *dve znanosti* se je ustalila v splošnem leksikonu kot skrajšano poimenovanje razlik med dvema naravnostma. To sta (1) naraščajoč konstruktivističen pogled na svet, ki je preplaval humanistiko, po katerem je znanstvena metoda videti kot zapredena v jezik in kulturo; in (2) znanstveno naziranje, po katerem lahko opazovalec še vedno objektivno ustvarja nepristranske observacije o naravi, takšne, ki niso kulturno zapredene. »Besedna zveza vztrajno živi kot neprecizna popularna okrajšava za razpoko – stvar nerazumevanja s pridihom sovražnosti – ki je zrasel med znanstveniki in literarnimi razumniki v modernem svetu.« (Gl. http://www.physicsdaily.com/physics/The_Two_Cultures)

⁵ Sama logika izključevanja, kot jo Husserl komentira v razpravljanju o krizi evropske zavesti, je inherentna napačno razumljeni racionalnosti in razumu.

⁶ To frazo najdemo v Goethejevem *Faustu* (Goethe 101).

⁷ Prim. stališča Nowotnyjeve ali pa poročilo Komiteja za preučevanje invencije, ki je bil sponzoriran kot Lemelson-MIT program in s strani National Science Foundation (*Invention*).

⁸ Modernistične matrice so bile sposobne zaobjeti protislovja realnosti in resnice. Spacialna forma, kot jo je v svojem zgodnjem analitičnem razbiranju modernizma teoretsko formuliral Joseph Frank (gl. Frank), je bila zmožna predstaviti pripovedovano realnost skozi mnogotere perspektive, skozi sopostavljen niz prezentiranih situacij v procesu.

⁹ »Zanesljiva vednost je vednost, ki ima visoko verjetnost, da je resnična, ker je bila njena verodostojnost upravičena z zanesljivimi metodami. Zanesljivo vednost včasih poimenujejo upravičeno resničnostno prepričanje, da bi razlikovali zanesljivo vednost od prepričanja, ki je napačno ali neupravičeno ali celo resnično, pa vendarle neupravičeno.« (Schafersman)

¹⁰ Ko se je soočal z zavestjo o nenehnih protislovljivih realnosti in resnice o njej, je modernizem s svojim baueilairovskim čutom za *neposrednost življenja*, bežeči trenutek, *sedanjost v njeni neposredni danosti*, v čisti trenutni kvaliteti, tj. kvaliteti kontingenčnosti, demonstriral skozi poteze naključnosti in fragmentarnosti v imaginističnih, futurističnih, eksresionističnih, konstruktivističnih, dadaističnih ali nadrealističnih obrazcih svojo zmožnost, da zajame odprtost in negotovost v procesu stvarjanja *poiesis*. Prim. tudi porajajočo novo izkušnjo humanistične informatike (Aarseth, »From Humanities Computing«) in poteze e-tekstualnosti; njihova *logika transfinitnega* tudi potrjuje svoje lastne izvore v modernistični matrici (Aarseth, *Cybertext*, Škulj, »A Dynamic«).

¹¹ S stališča semiotike je literatura *vzpostavljajoči*, *razvijajoči* se sistem.

¹² Literatura brez dvoma manifestira poteze kompleksnih sistemov, za katere velja, da jim je *težko določiti meje* in da je odločitev o tem končno odvisna od *opazovalca*; literatura obstaja kot *odprt sistem*; literatura ima kot sistem *spomin* in zgodovina literarnega sistema je pomembna zanjo; obstaja kot *dinamični sistem*; izkazuje obnašanje *vzpostavljajočega* se sistema; njeni sestavni deli utegnejo sami biti kompleksni sistemi itn. Literatura obstaja kot kompleksen modus sistemskih interakcij v večdimenzionalnem sistemskem okolju.

¹³ Thibault je v svoji knjigi *Agency and Consciousness in Discourse: Self-Other Dynamics as a Complex System* (2006) preučeval načine, v katerih sta delovanje in zavest izzvana skozi transakcije med jazom in drugim.

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Complexity, Literature, Sciences: Initial Remarks on Discourse and Dialogue

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Deep insights into the complex poetic system of modernism, a period founded during key historical shifts when views on language (as a system of signs) and its crucial role were newly valorised and the idea of point of view became thought-provoking for literature and arts as well as hard sciences (say, for Heisenberg), help shed new light on the role of humanities, later discussed in the rethinking of sciences by Nowotny et al. as one of five concrete contexts for the new production of knowledge in effective science policies. Literature exists as a vital segment of our living phenomenology, and the process of reading texts is a direct encounter with our human autopoietic adaptation and our own identity questioning. Two points are considered: autopoiesis and its sense in poiesis, and the potential of discourses in complex life dynamics.

Keywords: literature / humanities / science / language and consciousness / modernism / self-reference / self-reflexivity / dialogue / Maturana, Humberto R. / Heisenberg, Werner / Jakobson, Roman / Lotman, Yuri / Thibault, Paul J. / Nowotny, Helga

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Language was a trap, but the whole experience was a wonderful school in which one could discover how mute, deaf and blind one was. It was easy to be caught in one's own ego, but if one succeeded in attaining at least some degree of freedom from *it*, one began to listen and one's language began to change; and then, but only then, new things could be said.

(Maturana on his experience of May 1968 when the University of Chile entered a state of revolution: Maturana and Varela xvi)

Technology is [...] a queer thing. It brings you gifts with one hand, and stabs you in the back with the other.

(C.P. Snow, *New York Times*, 15 March 1971)

Both sciences and arts are, in essence, *inventive* instances, authorising and generating the potentials of human mind through history, and giving

power to new meanings. *Transgressive thinking* and *transgressive competence*¹ are effectively implicated in both, just as they are involved in any process of writing and reading literature. The spheres of the arts and literature are as much a part of human capital as are the sciences. Any discourse – literary or scientific – involves us in *transgressive*² operations; in fact, it opens up the issues of *transgressive cognition* (Perkins). Mark Turner even insists that ‘the mind is essentially literary’ (5) and that ‘narrative imagining – story – is the fundamental instrument of thought’ (4).³ Such views bring to the fore not only a rethinking of the basic task the humanities can have in the coming knowledge society, but also to supply more detailed insights into (and newly elaborated concepts to grasp) the reality principles of the world and man. A range of epistemological ideas elaborated by Nowotny, and by Maturana and Varela, have both stimulated and supported my recent thoughts on complexity, literature, and sciences.

The latent dialogue between different methodological traditions – of the *two cultures*⁴ (to echo a well-known lecture by C. P. Snow in 1959) – and the potent interplay of science, literature and the humanities has found an echo in early modernist shifts in the arts, calling for more complex schemes and notions in apprehending facts about the world and human existence in their *transient* actuality, as well as grasping the very facets of *conflict* and *contradiction*. Modernist art in actual fact encapsulates this very latent dialogue. The brief remark that ‘interfaces often start to show because of controversies’ made by Nowotny when interviewed by Hans Ulrich Obrist (see Obrist) is worthy of note here as it points to a better understanding of what lies behind modernist changes. Modernist art actually promotes (and thematises through its procedures) truth as *becoming* (see also Skulj, ‘Landscape’). Behind the modernist matrix (indicating the character of *complexity*, chaos, modelling, ‘networking’, etc) can be identified the system of knowledge which manifests a certain tendency to overcome binarism (as a logic of exclusion⁵). Hence a growing interest in *tropological* accounts found in modernist new art schemes and in scientific shifts of that time: both can be identified as a creative response of the *thinking brain*⁶ in the early 20th century. These trends underlying 20th century art and sciences give an early indication that what is happening is a shift from the disciplinary mode of knowledge production to a more transdisciplinary one, employing *scopic vision* (Spivak) or a double-oriented view of representations, aware that the role of ‘the observer is part of the described phenomena’ (Maturana). This visibly results in a breakthrough of the *transgressive thinking* in current trends of science policies.⁷ In an interview with Hans Ulrich Obrist, Nowotny advocated the idea of ‘presenting things visually’ – since ‘*seeing*’ and the ‘*image*’ open up other creative spaces – and

thus grasping *dynamic* knowledge, the very issues in the process (Obrist).⁸ As a strong supporter of contextualised knowledge and a promoter of the idea of moving from *reliable* knowledge⁹ – which ceases to be defined in a universalistic sense and becomes tied to a particular context – to *socially robust knowledge*, she argues for transforming science deep in its epistemological core. Her concept of

social robustness is a relational, not a relativistic or (still less) absolute idea. [...] [S]ocial robustness, in an important sense, is *prospective*; it is capable of dealing with unknown and unforeseeable contexts. [...] and last, socially robust knowledge has a strongly empirical dimension; it is subject to frequent testing, feedback and improvement because it is *open-ended*. (Nowotny, Scott and Gibbons, *Re-Thinking Science* 167)

Her research credo is revealed in Robert Musil's thought, quoted in her interview: *it is a movement that is supported by the sense of the possible*. A modernist disposition is easily recognizable in the vocabulary. The modernist matrix,¹⁰ which was, as Husserl later commented in his Vienna lecture, a response to the crisis of consciousness, was definitely inspiring. Sensible of complexity and of 'the human factor', it triggers new insights into reality principles. It also generates a much more dialogic response of human self-understanding. At the peak of modernism, science as well became aware, as Heisenberg commented, of the seminal role of language. Post-saussurean impact was fairly obvious.

Communication across institutional boundaries can give a fresh impetus to valid and responsive research interests. Literary studies, due to its theoretical and methodological advances and its conceptual territory, can seriously contribute to the new production of knowledge in transdisciplinary approaches.

A model case of valuable dialogue between literary studies and 'hard' science can be given. Commenting on Humberto Maturana's earlier fundamental views on the *Biology of Cognition* (1970), his fellow researcher Francisco J. Varela who is co-author of the seminal book on *Autopoiesis and Cognition: Realization of the Living* (1972) observed: 'If indeed the circular organization is sufficient to characterize living systems as unities, then one should be able to put it in more formal terms.' (Maturana and Varela xvii) The idea of *autopoiesis*, which they introduced to refer to 'the dynamics of the autonomy proper to living systems' (ibid.), points to the circular organisation or self-referential system as a key concept to understanding the organisation of living systems. The notion has its prehistory in literary studies, although Maturana, who in his 'Introduction' to *Autopoiesis and Cognition* records how he came upon his conceptual initiative, was not

aware of the well-circulated structuralist idea of a *self-referential, self-focused message* or *recursive reference* and of a *corollary feature of poetry* as discussed in Jakobson (370–371), i.e. of basic organising principles of the *poetic function* well thought-out in semiotic studies of literature.¹¹ Maturana gives the following explanations about the power of the word ‘poiesis’ he came upon by chance in literary studies.

[W]e were unhappy with the expression ‘circular organization’, and we wanted a word that would by itself convey the central feature of the organization of the living, which is autonomy. It was in these circumstances that one day, while talking with a friend (José Bulnes) about an essay of his on *Don Quixote de la Mancha*, in which he analyzed Don Quixote’s dilemma of whether to follow the path of arms (*praxis*, action) or the path of letters (*poiesis*, creation, production), and his eventual choice of the path of *praxis* deferring any attempt at *poiesis*, I understood for the first time the power of the word ‘poiesis’ and invented the word that we needed: *autopoiesis*. This was a word without a history, a word that could directly mean what takes place in the dynamics of the autonomy proper to living systems. Curiously, but not surprisingly, the invention of this word proved of great value. It simplified enormously the task of talking about the organization of the living without falling into the always gaping trap of not saying anything new because the language does not permit it. We could not escape being immersed in a tradition, but with an adequate language we could orient ourselves differently and, perhaps, from the new perspective generate a new tradition. (Maturana and Varela xvii)

The quotation not only reminds us how science, literature and the humanities may perhaps interface, but above all how elegantly and simply the world and the living being in it can be grasped in an integrated view of knowledge. Maturana’s use of the term *autopoiesis* exemplifies how to share and reuse relevant knowledge. Could it be said that the semiotics of literature and phenomenology of living systems are, deep at the epistemological core, much more interrelated than is usually assumed? The affirmative answer, no doubt, hints at an indispensable involvement of our own historical existence.

Autopoiesis literally means ‘self-creation’ (from the Greek *αὐτό* [*auto*], ‘self’, and *ποίησις* [*poiesis*], ‘creation, production’) – and according to the *Babylon English-English Dictionary* – implies ‘a process by which an organism or organization produces itself by repeating the reproduction process and constantly recreating itself (such as cells or organisms)’. A corresponding view of the corollary or self-referred sign in the poetic message as an essential element of literary discourse has been circulating since the early debates among the Prague Linguistic Circle (Mukařovsky, Jakobson) in the mid-thirties. In elaborating the idea of the self-oriented or *reflexive* poetic message, Jakobson in his ‘Closing Statement’ at a symposium on linguistics and poetics in late fifties explicitly stated: ‘*poeticalness* is *not a supplementation*

of discourse with rhetorical adornment *but a total re-evaluation of the discourse and all its components whatsoever*' (377; italics mine). A semantic issue turns out to be a structural matter, denoting the essential characteristics or organising principle of literariness, the very *differentia specifica* of verbal art.

As repeatedly stated, modernist inventions in literature gave a significant boost to extensive theoretical studies on literary phenomena (OPOJAZ, i.e. Obščestvo izučeniya POëtičeskogo JAZyka, Bakhtin's circle, the Prague Linguistic Circle, Ingarden's phenomenology, new criticism, structuralism, etc.) and finally prompted the initial steps towards the semiotics of literature and arts. The groundbreaking linguistic views of Saussure had an impact on the thorough examination of the systemic parameters of literature and the textual, and the idea of literary science (German *Literaturwissenschaft*) began circulating: one can find the phrase also in Jakobson and later in Lotman. Manifested in the materiality of language, literature was recognised as a complex,¹² rather tricky research subject. But this very complexity triggered a persistent interest in comprehending basic questions such as what literature is, why literary phenomena exist, how to explain the *differentia specifica* of literature in relation to ordinary language and to other schemes of art, how to identify the core of its literariness (i.e. *poeticalness* in Jakobson's sense), how to clarify its mode of existence. A historical outline of the advance of literary theoretical thoughts in the past century offers a remarkable picture.

The modernist breakthrough came about as a result of several crises – of language, of culture (Beebe; Bradbury and McFarlane; Calinescu; Luft), and of the self or identity (Le Rider). In two earlier articles, I discussed the issue in the context of Husserl's comments on the *crisis of consciousness* (Škulj, 'Landscape' 63–82; Škulj, 'Modernizem' 45–74). Modernism was, no doubt, a manifest crisis in *representational* modes. Its complex poetical schemes and reinvented narrative form with the inclusion of the reader in its structuring make clear modernist awareness of the *role of constructive act* through the reading process. Semiosis is a microcosm of human agency and consciousness (Thibault). Modernist inventions of poetry or the novel touch upon the very terrains of reinterpreted identities.

At the same time, language also became a vital issue in the hard sciences and Heisenberg made the noteworthy observation that *the very words applied to the description of the atomic level turn out to be problematic*. Aware of the role of language, he wrote:

Quantum mechanics have placed even more serious demands on us. We have had altogether to renounce the objective description of nature – in the Newtonian sense, according to which definite meanings were ascribed to such basic features of system as place, velocity, energy; and in its stead we have had to put the description of observation points, and for them the only certainty are the probabilities of

some of the results. The very *words* applied to the description of the atomic level then turn out to be problematic. We may talk of waves and particles, while remembering that we are not dealing with a dualistic, but with a fully unified description of the phenomena. *The meaning of old words has lost precision.* (Heisenberg, *Schritte über Grenzen*, 1973; qtd. in Lotman 270)

In his semiotic theory of culture, Lotman (269) makes the insightful remark that ‘questions of language affect all the sciences’ and reminds us of changes in modern science. He argues that it

has moved away from the naive view according to which the normal methods of perceiving and generalizing data were held to be valid, and the problem of the position of the describer in relation to the world being described was barely accounted for; it has moved away from the view according to which the scientist looked at reality ‘from the position of truth’, into the world of relativity. (Lotman 270)

The myth of scientist as an external observer and of reliable ‘objective’ knowledge thus collapsed. Three points in Heisenberg’s quotation are essential for modern science. First, that science has had to incorporate ‘the description of observation points’; second, that ‘the only certainty are probabilities’; and third, ‘that we are not dealing with a dualistic, but with a fully *unified* description’. Yet the most important is that ‘modern science from nuclear physics to linguistics sees *the scientist as inside the world being described and as a part of that world*’ (Lotman 270; italics mine).

In Maturana one can find similar assertions. Pointing to the cognitive function of the observer, he emphasises his strong awareness of the role of language in science: ‘*Everything said is said by an observer.* In his discourse the observer speaks to another observer, who could be himself. [...] The observer is a human being, that is, a living system, and whatever applies to living systems applies also to him.’ (Maturana and Varela 8; italics mine) ‘*The observer is a living system and an understanding of cognition as a biological phenomenon must account for the observer and his role in it.*’ (9) Maturana’s thought on the role of the observer in scientific discourse as if he ‘speaks to another observer, who could be himself’, is in conformity with Lotman’s position that ‘the object and the observer are as a rule described in different languages, and consequently the *problem of translation*, is a universal scientific task’. He goes on to remind us of Plato, who ‘defined thought as the *dialogue* of the soul with itself, [while making] the assumption that the conversation would be carried on in one language’ (Lotman 270). Nowadays, semiotics is aware of the agency of the *self* and of its relation to consciousness.¹³ And because the self is regarded as possessing *narrative identity* (Ricoeur 1991), its fluid, ever-changing, *responsive* ingredient is continually inscribed in the language use and in any signification.

Maturana (9) asserts that ‘the observer beholds simultaneously the entity that he considers (an organism, in our case) and the universe in which it lies (the organism’s environment). This allows him to interact independently with both and to have interactions that are necessarily outside the domain of interactions of the observed entity’. In his introductory paragraph, Thibault (2–3) reminds us that alterity is the primitive intrinsic value that motivates self-other relations and meaning-making activity.

The dialogic process also clearly has effect in the representation of scientific knowledge. The explanatory statement about scientific facts is the observer’s *construct* as a complex formed from a number of researched aspects; it also involves observer’s code, his own complex and heterogeneous world picture. The account of scientific facts is a result of preparatory analysis. It is created by the observer/researcher in the research process and is never something absolute. A fact is relative (true to a certain degree) and its understanding is in Lotman’s sense a *translation*. Such an idea of understanding as *translation* recognises the researcher’s presence – the *interference of a thinking being*, the *interference of his creative consciousness* (Lotman 233) – and the awareness of ‘how this presence affects the description’ (271).

Considering Lotman’s comments on the role of translation in cognition, two passages can be quoted in conclusion to disclose Nowotny’s position on the new paradigm of knowledge production (‘Mode 2’), leaving behind ‘Mode 1’ – ‘characterised by the hegemony of theoretical or, at any rate, experimental science’ (Nowotny, Scott and Gibbons, “‘Mode 2’ Revisited’ 179). The first quote concerns *reflexivity* and the *dialogic process*, while the second points to *the role of the humanities* in the production of knowledge. Her arguments on one of the characteristics of new mode of sciences and on one of the concrete contexts of sciences offer strong support to our discussion.

The fourth characteristic of ‘Mode 2’ knowledge is that it is *highly reflexive*. The research process can no longer be characterised as an ‘objective’ investigation of the natural (or social) world, or as a cool and reductionist interrogation of arbitrarily defined ‘others’. Instead, it has become a *dialogic process*, an intense (and perhaps endless) ‘conversation’ between research actors and research subjects – to such an extent that the basic vocabulary of research (who, whom, what, how) is in danger of losing its significance. As a result, traditional notions of ‘accountability’ have had to be radically revised. The consequences (predictable and unintended) of new knowledge cannot be regarded as being ‘outside’ the research process because problem-solving environments influence topic-choice and research-design as well as end-uses (Nowotny, Scott and Gibbons, “‘Mode 2’ Revisited’ 187; italics mine).

Discussing the specific contexts of current sciences, the commercialisation of research, development of mass higher education, globalisation,

the potential of refiguration of institutions and the management of Mode 2 knowledge, the most important, from my point of view, is that she highlights the role of the humanities.

The third context was *the role of the humanities* in the production of knowledge. The conventional view is that the humanities are the most detached disciplines, furthest removed from the turmoil of application and contextualisation. Their 'uses' are almost entirely internalised. Our account in *The New Production of Knowledge* challenged that view. Instead we saw the humanities as *the most engaged* of all disciplines, not simply because they flow through into the culture industry (for example, through novels and popular history), but because they comfortably (and inevitably) embody notions of *reflexivity* which the natural, and even social, sciences distrust (Nowotny, Scott and Gibbons, "Mode 2" Revisited¹⁸⁸; italics mine).

Complexities inherent to literature and the fascinating qualities, interesting and attractive, that our thoughts tend to concentrate on it and that prompt literary studies to research, are through the above comments seen from a different angle. In line with the views of Nowotny and Maturana, literary studies are a valuable ingredient in the new production of knowledge. The dialogue and mutual understanding between the 'two cultures' – exploring potentialities embedded in shared paradigms of investigation, such as the ideas of complexity, creativity, 'networking', the human factor, as well as the system, autopoiesis, self-reference, self-reflexivity, narrativisation, focalisation, etc. – demonstrate the need for *integrated* knowledge; it validate as well that the ACUME 2 project on interfacing 'hard' sciences, literature, and the humanities was a valuable step towards the new production of knowledge because our sense of *being* and our human condition are, as a rule, always inscribed in any cognition.

NOTES

¹ The notions can be found in Helga Nowotny ('Transgressive'), who also discussed 'The Potential of Transdisciplinarity' as one of characteristics of so-called 'Mode 2' knowledge production and who co-authored two seminal books, *The New Production of Knowledge* and *Re-Thinking Science*.

² Boundary transgression refers to mental moves that cross the boundaries of past practice and convention, tying together academic disciplines in unexpected ways, redefining not only means but often the problem itself, and challenging entrenched beliefs about the limits of the possible. (*Invention* 9)

³ The literary mind, according to Turner (4–5), is not peripheral but basic to thought. He claims that *language itself is a child of literary mind*. 'Narrative imagining – story – is the fundamental instrument of thought. Rational capacities depend upon it. [...] It is literary capacity indispensable to human cognition generally. This is the first way in which the mind is essentially literary.'

⁴ The *Two Cultures* (see Snow) is the title of an influential 1959 Rede Lecture at Cambridge University by British scientist and novelist C. P. Snow. He highlighted that the breakdown of communication between the ‘two cultures’ of modern society — the sciences and the humanities — was a major hindrance to solving the world’s problems. As a trained scientist who was also a successful novelist, Snow was well placed to pose the question. The term *two cultures* has entered the general lexicon as a shorthand for differences between two attitudes. These are (1) the increasingly constructivist world view suffusing the humanities, in which the scientific method is seen as embedded within language and culture; and (2) the scientific viewpoint, in which the observer can still objectively make unbiased and non-culturally embedded observations about nature. ‘The phrase has lived on as a vague popular shorthand for the rift—a matter of incomprehension tinged with hostility—that has grown up between scientists and literary intellectuals in the modern world.’ (See http://www.physicsdaily.com/physics/The_Two_Cultures)

⁵ The very logic of exclusion, as Husserl commented it, is inherent to wrongly grasped rationality and reason.

⁶ The phrase is borrowed from Goethe’s *Faust* (Goethe 101).

⁷ See also Nowotny’s views, or the report of the Committee for study of invention, sponsored by the Lemelson-MIT program and the National Science Foundation (*Invention*).

⁸ Modernist matrixes were capable of grasping contradictions of reality and truth. Spatial form (Frank) was able to represent the narrated reality from multiple perspectives.

⁹ ‘Reliable knowledge is knowledge that has a high probability of being true because its veracity has been justified by a reliable method. Reliable knowledge is sometimes called justified true belief, to distinguish reliable knowledge from belief that is false and unjustified or even true but unjustified.’ (Schafersman).

¹⁰ Confronting the consciousness of never-ending contradictions of reality and truth about it, modernism with its Baudelairean sense of the *immediacy of life*, of the fleeting instant, of *the present in its presentness*, in its purely instantaneous quality, i.e. quality of contingency, demonstrates through the features of fortuitousness and fragmentariness in Imagist, Futurist, Expressionist, Constructivist, Dadaist or Surrealist schemes, its unique ability to grasp the openness and uncertainty in the process of *poiesis*. Cf. also the emerging new experience of humanistic informatics (Aarseth, ‘From Humanities Computing’) and the features of e-textuality; their *logic of transfinite* confirms its own roots in the modernist matrix as well (Aarseth, *Cybertext*; Skulj, ‘A Dynamic’).

¹¹ In views of semiotics literature is an *emerging*, developing system.

¹² Literature clearly shows features of complex systems for which *the boundaries are difficult to determine* and the decision about it is ultimately made by the *observer*; literature exists as an *open* system; literature as a system has a *memory* and the history of literary system is important for it; it exists as a *dynamic system*; it exhibits behaviors that are *emergent*; its components may themselves be complex systems, etc. Literature exists as a complex mode of systemic interaction in a multidimensional systemic environment.

¹³ Thibault explores the ways in which agency and consciousness are created through transactions between self and other (see Thibault).

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