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JANINA BUCZKOWSKA

REALIZM NAUKOWY WOBEC ZMIANY TEORII W NAUCE

Streszczenie. Ważnym elementem współczesnej dyskusji pomiędzy realizmem i antyrealizmem naukowym jest próba nadania realistycznej interpretacji historycznemu faktowi zmiany teorii w nauce. Fakt ten według L. Laudana podważa nie tylko najważniejszy argument na rzecz realizmu naukowego, ale i najważniejsze tezy tego stanowiska. Argumentem kwestionowanym przez Laudana jest twierdzenie H. Putnama, że ogromny sukces nauki w przewidywaniu zjawisk i rozwijaniu nowych technologii świadczy przynajmniej o aproksymacyjnej prawdziwości teorii naukowych. Laudan wykazuje jednak fakty z historii nauki, gdy odnoszące sukces teorie okazywały się z biegiem czasu fałszywe. Powiązany z tym argument przeciwko realizmowi, zwany pesymistyczną indukcją (PM), głosi, iż skoro przeszłe teorie, które odniosły sukces, okazywały się fałszywe z perspektywy nowszych, to także obecne odnoszące sukces teorie mogą okazać się w przyszłości fałszywe. Podważa to tezę odnośnie związku sukcesu teorii z jej aproksymacyjną prawdziwością. Ważnym wyzwaniem dla realizmu naukowego staje się zatem uzgodnienie jego tez z faktem zmiany teorii w nauce. Najbardziej znaczących rozwiązań tego problemu dostarcza realizm strukturalny zaproponowany przez J. Worralla i semirealizm A. Chakrawarttiego. Oba stanowiska przyjmują tę samą strategię obrony realizmu, zwaną *divide et impera*, uznającą, że nie całe teorie, lecz tylko ich fragmenty bezpośrednio związane z sukcesem spełniają tezy realizmu. Realizm naukowy w tych sformułowaniach zostaje w znacznym stopniu ograniczony i osłabiony. Celem artykułu jest przedstawienie tych rozwiązań i pokazanie z jednej strony realistycznych odpowiedzi na argument PI, jakich dostarczają te stanowiska, z drugiej ograniczeń, jakie z nich wynikają dla realizmu naukowego. Osłabiona wersja realizmu, jaką one proponują, również nie jest wolna od istotnych trudności, na jakie musi odpowiedzieć zarówno realizm strukturalny, jak i semirealizm. Identyfikacja tych trudności może stanowić wskazówkę dla dalszego rozwoju stanowiska realistycznego.

Słowa kluczowe: realizm naukowy; realizm konwergentny; realizm strukturalny; semirealizm; aproksymacyjna prawda; strategia *divide et impera*

1. WSTĘP

W ostatnich kilku dekadach główna oś sporu realizmu naukowego z antyrealizmem jest wyznaczona przez dwa podstawowe argumenty wysuwane przez opozycyjne strony: argument na rzecz realizmu, sformułowany przez H. Putnama, odwołujący się do sukcesu nauki, zwany argumentem z braku cudów (NMA) oraz argument przeciw realizmowi, odwołujący się do historycznych faktów radykalnej zmiany teorii w nauce. Argument antyrealistyczny oparty na fakcie, że teorie uznawane w przeszłości za prawdziwe, okazywały się z biegiem czasu fałszywe, nosi nazwę pesymistycznej indukcji (PM). Podważa on wiarygodność współczesnych teorii odnoszących sukces, a przez to argument MNA i cały realizm naukowy. Wyzwaniem dla realizmu naukowego stało się zatem pogodzenie ogromnego sukcesu współczesnych teorii naukowych z faktem, że przeszłe teorie, również odnoszące sukces, okazywały się z perspektywy czasu fałszywe.

W artykule zostaną przedstawione najbardziej znaczące stanowiska dostarczające odpowiedzi na to wyzwanie, czyli realizm strukturalny i semirealizm. Omówienie możliwości obrony tez realizmu naukowego w ramach tych stanowisk, jak również dokonujące się w nich osłabienie i zawężenie realizmu, stanowi główną treść artykułu. Następująca w końcowej części analiza trudności, na jakie napotykają te stanowiska, pozwoli wskazać zagadnienia, które pozostają nadal otwarte i wymagają dalszego opracowania z perspektywy realizmu naukowego.

2. KRYTYKA REALIZMU KONWERGENTNEGO I JEGO EWOLUCJA POD WPŁYWEM ARGUMENTU PESYMISTYCZNEJ INDUKCJI

Punktem wyjścia współczesnej dyskusji był realizm naukowy w wersji zwanej realizmem konwergentnym, który przyjmuje, że teorie naukowe, które odniosły sukces empiryczny, są prawdziwe lub co najmniej aproksymacyjnie prawdziwe, a obecne teorie są bliższe

prawdy, niż ich poprzedniczki. Twierdzi też, że terminy teoretyczne dojrzałych teorii mają realne odniesienia, a ich twierdzenia są zachowane w następujących po nich teoriach, jeśli nie w tej samej formie, to przynajmniej jako graniczne przypadki. Głosi też często, że nowsze teorie (w danej dziedzinie) wyjaśniają sukces swoich poprzedniczek. Aby wyjaśnić, jak kolejne teorie coraz bardziej zbliżają się do prawdy, zwolennicy tego stanowiska odwołują się do pojęcia aproksymacyjnej prawdy, która bywa różnie rozumiana, o czym będzie mowa w dalszej części rozważań.

Realizm konwergentny był formułowany przez różnych autorów na nieco inne sposoby, wyrażał on jednak zawsze ogólną tezę realizmu naukowego, że nauka bada i opisuje świat, jaki istnieje niezależnie od ludzkiego poznania i rezultatem tego poznania jest prawdziwa lub aproksymacyjnie prawdziwa wiedza o świecie. Obserwowany rozwój nauki, dzięki stosowanym w niej metodom poznawczym, przebiega w kierunku coraz bardziej prawdziwych teorii na temat rzeczywistości[1].

Kluczowym obecnie argumentem na rzecz realizmu naukowego jest wysunięty przez Hilarego Putnama argument z sukcesu nauki. Uznaje on realizm naukowy za najlepsze wyjaśnienie tego sukcesu. Jak mówi autor „realizm jest jedyną filozofią, która nie czyni sukcesu nauki cudem"[2]. Jest to obecnie najważniejszy argument na rzecz realizmu naukowego. Łączy on sukces teorii naukowej z jej aproksymacyjną prawdziwością. Jeśli sukces, jaki osiągają teorie naukowe w przewidywaniu zjawisk i rozwoju nowych technologii, jest najlepiej wyjaśniany przez założenie, że teorie naukowe dostarczają prawdziwej wiedzy o świecie i postulowane przez nie obiekty realnie

1 Jedno ze sformułowań podaje np. R.N. Boyd, *On the Current Status of the Issue of Scientific Realism*, Erkenntnis 19(1983)1-3, 45-90, 45.

2 H. Putnam, *What is Mathematical Truth?*, w: *Mathematics, Matter and Method, Collected Papers, Vol. 2*, Cambridge 1975, 60-78, 73.

istnieją, to skoro sukces nauki jest faktem, realizm naukowy jest przypuszczalnie prawdziwy.

Ta ogólna idea od początku budziła wiele wątpliwości, jak też wymagała dalszych uściśleń. Bardziej precyzyjne sformułowanie tego argumentu wymagało doprecyzowania pojęcia sukcesu nauki oraz wyróżnienia teorii naukowych, do których należy odnosić tezy realizmu. Nie każdą bowiem teorię pojawiającą się w nauce należy uważać za prawdziwą lub aproksymacyjnie prawdziwą. W rezultacie przyjęło się, że sukces teorii rozumiany jest w sensie sukcesu predykcyjnego, czyli sukcesu w formułowania skutecznych nowatorskich prognoz. Tylko do teorii, które odniosły tego rodzaju sukces należy, zdaniem Alana Musgrave'a, odnosić tezy realizmu naukowego[3]. Teorie te określane są jako „dojrzałe teorie" lub „najlepsze teorie".

Bardziej formalnie NMA ujmowany jest jako rodzaj wnioskowania do najlepszego wyjaśniania. Zgodnie z tą zasadą, jak pisze Adam Grobler, „hipotezę, która dostarcza najlepszych (spośród dostępnych) wyjaśnień zjawisk rozpatrywanej dziedziny, należy uznać za przypuszczalnie prawdziwą"[4]. Zarówno przeciwko samemu wnioskowaniu do najlepszego wyjaśnienia, jak i takiemu ujęciu NMA, wysunięto liczne zastrzeżenia z pozycji antyrealistycznych.

Np. Bastiaan C. van Fraassen twierdził, że sukces nauki nie potrzebuje żadnego szczególnego uzasadnienia[5]. Teorie naukowe są, według niego, poddane metodologicznej selekcji na wzór selekcji adaptacyjnej i jedynie teorie, które mają znaczny sukces empiryczny, mogą przetrwać w nauce, podobnie jak tylko dobrze ewolucyjnie przystosowane organizmy mogą przetrwać w przyrodzie. Zdaniem van Fraassena, sens, w jakim w tym kontekście sukces teorii może być rozumiany, to sukces empiryczny, polegający na skutecznym

3 A. Musgrave, *Ostateczny argument za realizmem naukowym*, tłum. z ang. M. Kotowski, w: *Spór o realizm naukowy*, red. M. Kotowski, Wrocław 2018, 89-116, 93.

4 A. Grobler, *Prawda a względność*, Kraków 2000, 110.

5 B.C. van Fraassen, *The Scientific Image*, Oxford 1980, 40.

przewidywaniu całkiem nowych kategorii zjawisk, czyli sukces predykcyjny. Sukces taki dowodzi jednak tylko empirycznej adekwatności teorii, nie oznacza zaś, że teoria jest prawdziwa lub aproksymacyjnie prawdziwa. Najlepsze teorie naukowe, jego zdaniem, odniosły tego rodzaju sukces, ale są one prawdziwe jedynie odnośnie do faktów obserwacyjnych, nie są natomiast prawdziwe lub aproksymacyjnie prawdziwe odnośnie do nieobserwowalnych obiektów postulowanych przez teorie.

Z formalnego punktu widzenia zasada wnioskowania do najlepszego wyjaśnienia opiera się na wnioskowaniu abdukcyjnym[6]. Niekonkluzywność abdukcji i jej trudności stały się początkiem długiej i bogatej dyskusji toczonej wokół bayesiańskiego sformułowania NMA. Np. Colin Howson przedstawił i rozwinął bayesowską rekonstrukcję NMA, wykazując, że jest to argument wewnętrznie sprzeczny[7]. Przeciwko takiemu stanowisku argumentują jednak np. J. Worrall[8] i S. Psillos[9], którzy twierdzą, że rekonstrukcja, jaką proponuje Howson, nie jest odpowiednia dla NMA. Ten wątek dyskusji, choć interesujący z formalnego punktu widzenia, nie dotyczy jednak bezpośrednio przedmiotu dyskutowanego w tym artykule.

Największy wpływ na dalszy bieg omawianej dyskusji wywarła krytyka argumentu NMA przedstawiona przez Larry'ego Laudana[10]. Zapoczątkowała ona stopniową, ale wyraźną ewolucję realizmu konwergentnego, która doprowadziła do radykalnego ograniczenia tez realizmu naukowego w kolejnych jego sformułowaniach. Laudan odrzuca w niej główne tezy realizmu. Kwestionuje, że dojrzałe teorie

6 S. Psillos, *Scientific Realism: How Science Tracks Truth*, London 1999, 203-215.

7 Por. C. Howson, *Hume's Problem: Induction and the Justification of Belief*, Oxford 2000, jak również odpowiedź na przedstawione mu zarzuty w: C. Howson, *Exhuming the No Miracles Argument*, Analysis 73(2013)2, 205-211.

8 J. Worrall, *Miracles and Models: Why Reports of the Death of Structural Realism May Be Exaggerated*, Royal Institute of Philosophy Supplements 61(2007)10, 125-154.

9 S. Psillos, *Knowing the Structure of Nature*, New York 2009.

10 L. Laudan, *Obalenie realizmu konwergentnego*, tłum. z ang. M. Kotowski, w: *Spór o realizm naukowy*, dz. cyt., 29-65.

naukowe są na ogół aproksymacyjnie prawdziwe, a teorie nowsze w danej dziedzinie są bliższe prawdy, niż teorie starsze, jak też, że obserwacyjne oraz teoretyczne pojęcia, które występują w teoriach nauk dojrzałych, posiadają odniesienie przedmiotowe. Ponadto poddaje w wątpliwość twierdzenie realizmu konwergentnego, że w nauce dojrzałej przyszłe teorie będą zachowywać teoretyczne relacje i postulowane przedmioty odniesienia teorii wcześniejszych. Kwestionuje też argument Putnama, że tak rozumiany realizm dostarcza najlepszego wyjaśnienia sukcesu nauki[11].

Odwołując się do faktów z historii nauki, Laudan pokazuje, że w historii nauki jest wiele teorii, które pomimo że odniosły sukces empiryczny, okazały się fałszywe z perspektywy czasu, a postulowane przez nie nieobserwowalne obiekty (jak np. flogiston lub eter) zostały uznane za nieistniejące. Przedstawia całą listę takich teorii, które mają przeczyć tezom realizmu[12]. Sukces teorii nie przesądza, zdaniem Laudana, ani o jej prawdziwości, ani o istnieniu postulowanych przez nią obiektów teoretycznych.

Fakty, które przytacza Laudan, są podstawą dla mocnego kontrargumentu przeciwko realizmowi, jakim jest pesymistyczna indukcja (PI), nazywana też pesymistyczną meta-indukcją (w skrócie PMI). Argument ten głosi, że jeśli przeszłe teorie, które w swoim czasie odnosiły sukces (także predykcyjny), okazywały się wraz z rozwojem nauki fałszywe, to najlepsze współczesne teorie odnoszące taki rodzaj sukcesu, mogą również okazać się w przyszłości fałszywe. Sukces predykcyjny teorii, w kontekście radykalnej zmiany teorii, nie jest, w myśl PI, argumentem na rzecz jej prawdziwości. Ten kontrargument stanowi dla realizmu poważne wyzwanie. Realista naukowy musi wyjaśnić zmiany teorii naukowych, jednocześnie zachowując związek prawdziwości teorii naukowych i realność postulowanych

11 Tamże, 31.

12 Tzw. Lista Laudana. Por. tamże, 35-47.

przez nie obiektów z ich sukcesem predykcyjnym, inaczej podstawowy argument realizmu traci swą siłę.

Odpowiedzią ze strony realizmu na argument PI są między innymi formalne próby podważenia adekwatności stosowania PI w stosunku do współczesnych teorii. Np. Ludwig Fahrbach[13] wskazuje, że ogromny rozwój nauki od początku drugiej połowy XX wieku sprawia, iż współczesne i przeszłe teorie, ze względu na ich empiryczne ugruntowanie, nie mogą być traktowane podobnie, nie ma zatem podstaw do indukcyjnych wniosków w sensie PI. Twierdzi on, że wniosek PI jest niepoprawny, gdyż był wyprowadzony na podstawie nieuprawnionej projekcji faktów dotyczących przeszłych teorii na fakty o teoriach współczesnych i przyszłych. Pogląd, że współczesne teorie należy traktować w inny sposób niż przeszłe, podzielają także np. Gerald Doppelt[14], Juha Saatsi[15], Seungbae Park[16] i inni.

Odwrotnie twierdzi K. Brad Wray[17], broniący PI. Dowodzi on, że z perspektywy przyszłości współczesne teorie okażą się tak samo mało uzasadnione, jak przeszłe z perspektywy nauki współczesnej. Zatem przeszłe i obecne teorie należy traktować tak samo, co czyni argument PI poprawnym. Podobnych argumentów używa także P. Kyle Stanford[18].

Te i podobne próby wykazania słabości metodologicznej argumentu PI są ważne z tego względu, że skłaniają do analizy metod powoływania się na historię nauki w filozoficznej refleksji nad

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13 L. Fahrbach, *How the Growth of Science Ends Theory Change*, Synthese 180(2011)2, 139-155.

14 G. Doppelt, *From Standard Scientific Realism and Structural Realism to Best Current Theory Realism*, Journal for General Philosophy of Science 42(2011)2, 295-316.

15 J. Saatsi, *Grasping at Realist Straws*, Metascience 18(2009)3, 355-362.

16 S. Park, *On Treating Past and Present Scientific Theories Differently*, Kriterion 31(2017)1, 63-76.

17 K.B. Wray, *Pessimistic Induction and the Exponential Growth of Science Reassessed*, Synthese 190(2013)18, 4321-4330.

18 P.K. Stanford, *Catastrophism, Uniformitarianism, and a Scientific Realism Debate. That Makes a Difference*, Philosophy of Science 82(2015)5, 867-878.

rozwojem nauki. Wskazują, że przejście pomiędzy historią i filozofią nauki nie jest jednoznaczne i wymaga dodatkowej refleksji. Pomijają one jednak merytoryczny aspekt sporu.

Argument PI ujawnił potrzebę określenia kryteriów, jakie spełniać mają teorie, o których już była wzmianka, a które bierze się pod uwagę w dyskusji nad realizmem naukowym. Według realistów takich jak John Worrall[19] i Stathis Psillos[20] nie są to wszystkie teorie, jakie odniosły sukces empiryczny, ale są to tzw. dojrzałe teorie, jak np. w fizyce teoria względności czy teoria kwantowa. Wyróżnikiem dojrzałej teorii jest dodatkowo, obok sukcesu predykcyjnego, stabilność teorii w czasie oraz wobec testów empirycznych, jak też ugruntowanie w odniesieniu do innych teorii dobrze potwierdzonych zgodnie z metodologią danej dziedziny. Ograniczenia te nie eliminują jednak niektórych teorii, które choć spełniały warunki sukcesu dojrzałych teorii, to zostały odrzucone.

Istnienie takich teorii stanowi duży problem, gdyż jak dowodzi Timothy D. Lyons, wnioskowanie na podstawie listy Laudana bądź innej listy teorii, które odniosły sukces, lecz zostały odrzucone, ma raczej status logiczny wnioskowania *modus tollens*, niż wnioskowania indukcyjnego z fałszywości przeszłych teorii o fałszywości współczesnych. Zatem wystarczą pojedyncze kontrprzykłady, aby uchylić ogólny związek pomiędzy sukcesem teorii a jej aproksymacyjną prawdziwością[21].

Dużą trudność dla realizmu konwergentnego stanowi też podstawowe pojęcie aproksymacyjnej prawdziwości teorii, które w tych rozważaniach jest rozumiane intuicyjnie. Próby określenia ilościowego przybliżonej prawdziwości czy prawdopodobieństwa teorii

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19 J. Worrall, *Realizm strukturalny. To co najlepsze z dwóch światów*, tłum. z ang. M. Kotowski w: *Spór o realizm naukowy*, dz.cyt., 162-163.

20 S. Psillos, *Scientific Realism: How Science Tracks Truth*, dz. cyt., 105-108.

21 Por. D.T. Lyons, *Four Challenges to Epistemic Scientific Realism – and the Socratic Alternative*, Spontaneous Generations: A Journal for the History and Philosophy of Science 9(2018)1, 146.

w sensie ich podobieństwa do prawdy, zapoczątkowane przez Poppera i wciąż podejmowane, nie przyniosły powszechnie uznanych rezultatów. Dla uściślenia pojęcia aproksymacyjnej prawdy tacy autorzy, jak np. John Worrall, Robert Boyd i Anjan Chakravartty[22], wskazują pewne jakościowe warunki tego, kiedy jedna teoria jest bardziej aproksymacyjnie prawdziwa od drugiej. Daje to podstawę dla porównania następujących po sobie teorii w aspekcie zbliżania się do prawdy w procesie rozwoju nauki. Jest to jednak relatywne określenie aproksymacyjnej prawdziwości. Argument PI skłonił do głębszej refleksji metodologicznej nad argumentem z sukcesu nauki i przyczynił się do większego sformalizowania postaci realizmu naukowego, uściślenia jego pojęć i zawężenia jego zakresu do pewnej tylko grupy teorii dojrzałych.

Powszechnie przyjmowana obecnie strategia obrony realizmu opiera się na założeniu, że odrzucone teorie, choć nie są w całości aproksymacyjnie prawdziwe, to zawierają pewne elementy, które można wyodrębnić jako bezpośrednio odpowiedzialne za sukces predykcyjny teorii i które można w świetle nowszych teorii uznać za aproksymacyjnie prawdziwe. Te fragmenty zostają w jakiejś formie zachowane w teoriach następnych, jako kumulatywny składnik wiedzy o zjawiskach. Ta strategia obrony realizmu naukowego określana jest jako strategia *divide et impera*[23]. Strategia ta prowadzi do formułowania bardziej ograniczonych wersji realizmu naukowego zwanych realizmem selektywnym, częściowym lub rozwiniętym (*deployment realism*)[24].

Głosi ona, że tylko te fragmenty teorii, które są bezpośrednio odpowiedzialne za jej sukces predykcyjny, mogą być interpretowane

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22 A. Chakravartty, *Truth and Representation in Science: Two Inspirations from Art*, w: *Beyond Mimesis and Convention: Representation in Art and Science*, red. R. Frigg, M. Hunter, Dordrecht 2010, 33-50.

23 S. Psillos, *Scientific Realism: How Science Tracks Truth*, dz. cyt., 108.

24 P. Vickers, *Understanding the Selective Realist Defence Against the PMI*, Synthese 194(2017)9, 3221-3232.

realistycznie, jako aproksymacyjnie prawdziwe tezy o zjawiskach. Problemem dla tej strategii jest to, że nie wiemy, które fragmenty teorii są aproksymacyjnie prawdziwe, dopóki nowa teoria nie odsłoni ich kumulatywnego charakteru. Kumulatywne elementy teorii można dokładnie wyodrębnić dopiero z perspektywy jej następczyni. Jako praktyczne kryterium oceny przybliżonej prawdziwości teorii (z perspektywy jej własnych osiągnięć) nadal pozostaje znaczący sukces predykcyjny, który ona generuje. Nie wiadomo jednak, który z jej składników zawiera owo „ziarno prawdy", a który okaże się fałszywy. Dopiero sformułowanie kolejnej teorii, która odniesie sukces, pozwoli wyodrębnić części, które w jej świetle okażą się prawdziwe. Na czym jednak opierać ma się założenie, że nowsza teoria jest aproksymacyjnie prawdziwa i że zgodność z nią może być kryterium aproksymacyjnej prawdziwości elementów poprzedniczki, jeśli nie ma kolejnej teorii?

Argument PI przyczynił się do uściślenia, zawężenia, przeformułowania i osłabienia tez realizmu[25]. Zakres teorii, jakie realizm bierze pod uwagę, został ograniczony do teorii dojrzałych, które rozumiane są najczęściej jako posiadające znaczny sukces predykcyjny. Warunek prawdziwości lub aproksymacyjnej prawdziwości, odnoszony do teorii naukowych, rozumianych jako całość, został ograniczony jedynie do wybranych elementów, bezpośrednio odpowiedzialnych za sukces predykcyjny teorii. Elementy te, zgodnie ze strategią *divide et impera*, stanowią kumulatywną część nauki. Podobnie, nie wszystkie terminy teoretyczne mają swoje realne odniesienia, a tylko te, które są postulowane przez wyodrębnione komponenty teorii odpowiedzialne za jej sukces predykcyjny[26].

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25 Por. M. Kotowski, *O rozwoju realizmu naukowego jako selektywnego sceptycyzmu*, Filozofia Nauki 22(2014)3, 105-123 oraz Tenże, *Realizm zreformowany. Filozofia Iana Hackinga a spór o status poznawczy wiedzy naukowej*, Wrocław 2016.

26 A. Chakravartty, *Semirealism*, Studies in History and Philosophy of Science 29(1998)3, 396.

3. REALIZM STRUKTURALNY I SEMIREALIZM JAKO ODPOWIEDŹ NA ARGUMENT ZE ZMIANY TEORII W NAUCE

Najbardziej znaczących odpowiedzi na wyzwanie, jakie stanowią dla realizmu naukowego radykalne zmiany teorii, dostarczają zaproponowany przez Johna Worrala[27] realizm strukturalny oraz semirealizm A. Chakravartty'ego[28], będące syntezą realizmu naukowego i argumentu PI[29].

Worrall przyjmuje, że dla obrony realizmu należy wykazać, iż pomimo radykalnych zmian teorii rozwój nauki jest zasadniczo kumulatywny. Aproksymacyjnie prawdziwy element teorii T_1 powinien być zachowany nie tylko w następującej po niej teorii T_2, ale i w kolejnej teorii T_3, zastępującej z czasem teorię T_2. Te powiązane z sukcesem predykcyjnym elementy poprzedniczki, które zostają zachowane w jej następczyni, można uznać za aproksymacyjnie prawdziwe.

Worrall przyjmuje strategię *divide et impera*, uznając, że elementy teorii, które są odpowiedzialne za jej sukces predykcyjny, są aproksymacyjnie prawdziwe i jako takie zostały zachowane w następnych po niej teoriach. Warunek ten wyraża kumulatywny charakter rozwoju wiedzy, w którym nowe teorie przejmują prawdziwe części swoich poprzedniczek, odrzucając fałszywe[30]. Stąd zachowanie elementów poprzedniczki w następnej teorii staje się kryterium uznania ich za aproksymacyjnie prawdziwe. Strategia ta pozwala Worrallowi skutecznie bronić realizmu naukowego.

Pojęcie aproksymacyjnej prawdziwości, pomimo wprowadzonych uściśleń, nadal pozostaje intuicyjne i nie do końca jasne. Można pytać:

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27 J. Worrall, *Realizm strukturalny. To co najlepsze z dwóch światów*, tłum. z ang. M. Kotowski w: *Spór o realizm naukowy*, dz. cyt., 145-175.

28 A. Chakravartty, *Semirealism*, dz. cyt.

29 Stanowiska te mają swoich kontynuatorów i są rozwijane, ale w tym artykule ograniczę się tylko do wymienionych dwu autorów. Rozwój stanowisk nie wpłynął bowiem znacząco na zmianę podejmowanych tu kwestii.

30 J. Worrall, *Realizm strukturalny. To co najlepsze z dwóch światów*, dz. cyt., 153-154.

w jakim sensie teoria Newtona jest przybliżeniem teorii względności Einsteina? Np. STW Einsteina nie jest prostym rozszerzeniem teorii Newtona, choć przejmuje sukces empiryczny teorii Newtona. Pomimo że przy przejściu od teorii Newtona do teorii Einsteina empiryczna treść teorii okazała się kumulatywna, to teoretyczna treść obu teorii nie jest taka, np. zgodnie z teorią Newtona, czas jest absolutny, a masa ciał jest stała ze względu na prędkość, natomiast według teorii Einsteina, czas jest względny, a masa ciał rośnie wraz z ich prędkością. Jak głosi Thomas Kuhn, następujące po sobie teorie są niewspółmierne i nie zachodzi teoretyczna ciągłość między nimi. Dają one odmienne obrazy świata, których nie sposób porównać, ich ontologie są całkowicie różne. Nawet jeśli teorie te operują tymi samymi terminami, to terminy te mają inne znaczenia. Kuhn przytacza na to wiele przykładów[31].

Van Fraassen twierdzi, że w wypadku radykalnej zmiany teorii kumulatywna jest tylko treść empiryczna teorii. Treść teoretyczna natomiast, wraz z postulatami odnośnie istnienia nieobserwowalnych obiektów i ich własności, ulega zmianie wraz ze zmianą teorii[32].

Worrall wykazuje jednak, że w przypadku radykalnej zmiany dojrzałych teorii nie tylko treść empiryczna wcześniejszej teorii T_1 jest zachowana w nowej teorii T_2, ale też istotny element treści teoretycznej, jaki stanowią matematyczne równania teorii. Równania te, zdaniem Worralla, reprezentują realne, podstawowe struktury zjawisk. Rozwija on ideę Poincarego, że struktura matematyczna dojrzałych teorii naukowych odzwierciedla realne przyczynowe struktury rzeczywistości. Zmiana teorii nie podważa struktury samych relacji przyczynowych i odzwierciedlających je równań, choć może podważyć ontologię, w jakiej je interpretowano.

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31 T.S. Kuhn, *Struktura rewolucji naukowych*, tłum. z ang. H. Ostromęcka, Warszawa 2001, 257-262. Szerokie omówienie problemu niewspółmierności można znaleźć np. w: K. Jodkowski, *Teza o niewspółmierności w ujęciu Thomasa Kuhna i Paula Feyerabenda*, Lublin 1984.

32 B.C. van Fraassen, *The Scientific Image*, dz. cyt., 40.

Przykładem swoich rozważań Worral czyni przypadek przejścia w optyce pomiędzy teorią światła Fresnela i teorią Maxwella. Teoria Fresnela należy do wskazanych przez Laudana teorii, które odniosły sukces predykcyjny, ale zostały odrzucone z czasem jako fałszywe. Zgodnie z teorią Fresnela światło jest falą poprzeczną, rozchodzącą się w eterze. Teoria ta odniosła sukces empiryczny i predykcyjny, pomimo że zakładała istnienie drgającego mechanicznego eteru, które zostało z czasem zanegowane. Teorię Fresnela zastąpiła teoria Maxwella, zgodnie z którą światło jest poprzeczną falą elektromagnetyczną. Obie teorie różnią się odnośnie do natury światła i w tym aspekcie są sprzeczne. Jeśli jednak ograniczymy się do poziomu niezinterpretowanych równań matematycznych, to zachodzi zgodność pomiędzy równaniami Fresnela i odpowiadającymi im równaniami wyprowadzonymi z teorii Maxwella[33]. Formalizm matematyczny Fresnela pozwala na prawdziwe przewidywania zjawisk, gdyż, zdaniem Worralla, odzwierciedla realne, nieobserwowalne struktury rzeczywistości. Pozostaje on niezmieniony przy przejściu od jednej dojrzałej teorii do drugiej, pomimo że jego interpretacja ulega znaczącej zmianie. Zbieżność matematycznej postaci równań jest dla Worralla podstawowym argumentem na rzecz postulowania pewnej formy kumulatywizmu w nauce. To, co jest kumulatywne obok treści empirycznej, to struktury matematyczne reprezentujące realne, choć nieobserwowalne struktury rzeczywistości. Te struktury formalne to jedyne, co możemy poznać o rzeczywistości. Ich ontologiczna interpretacja zmienia się wraz ze zmianą teorii. Odzwierciedlają one realne choć nieobserwowalne relacje przyczynowe, zachodzące w zjawiskach.

Przypadek przejścia od teorii Fresnela do teorii Maxwella nie jest reprezentatywny dla sytuacji zmiany teorii w nauce. Worrall przyjmuje jednak, że o zachowaniu równań można mówić także, gdy pomiędzy równaniami teorii T_1 i równaniami jej następczyni

33 J. Worrall, *Realizm strukturalny. To co najlepsze z dwóch światów*, dz. cyt., 169.

T_2 zachodzi graniczna zbieżność w sensie przyjmowanej w fizyce zasady korespondencji[34].

Relacja korespondencji zachodzi, gdy równania starszej teorii są granicznymi przypadkami odpowiednich równań nowszej teorii, jak np. w wypadku równań teorii Newtona i teorii relatywistycznej Einsteina. Jednak w takim wypadku równania starej teorii nie są odtworzone w nowej. Jak twierdzi Chakravartty, oba układy równań mogą być nawet ze sobą sprzeczne, ponieważ w wyniku bardziej precyzyjnych pomiarów i szerszego zakresu zjawisk nowe teorie dodają do równań nowe terminy, aby lepiej uchwycić złożoność badanych zjawisk. Jednak równania nowszej teorii przyjmują postać równań starej, jeśli określona wielkość nowej teorii przyjmuje graniczną wartość. Są one szczególnym przypadkiem równań nowej teorii o całkiem innej postaci[35].

Worrall uznaje, że taka semikumulatywność w sensie relacji korespondencji jest istotnym rodzajem kumulatywności i odpowiada podstawowej realistycznej idei, że sukces predykcyjny dojrzałych teorii nie pozostaje bez związku z ich prawdziwością. Jeśli teoria T_1 może być rozważana w jakimś zakresie jako graniczny przypadek teorii T_2, wtedy teoria T_1 w tym zakresie aproksymuje teorię T_2.

Według strukturalizmu Worralla aproksymacyjna prawdziwość odnosi się jedynie do formalizmu matematycznego, który opisuje relacyjne struktury rzeczywistości i który stanowi jedyną prawdziwą wiedzę o rzeczywistości. Każda teoria dodaje do owych struktur matematycznych właściwą dla siebie ontologię, która nie jest zachowywana przy zmianie teorii (np. przy przejściu od teorii Fresnela do teorii Maxwella, od teorii Newtona do teorii Einsteina itp.) Według realizmu strukturalnego teorie naukowe nie mówią niczego

34 Por. H. Post, *Correspondence, invariance and heuristics*, Studies in History and Philosophy of Science 2(1971)3, 213-255.

35 A. Chakravartty, *Semirealism*, dz .cyt., 399.

wiążącego o naturze obiektów ukrytych za tą strukturą. Natura i własności nieobserwowanych obiektów pozostają nieznane.

Realizm strukturalny broni więc bardzo ograniczonej formy realizmu naukowego. Wiedza pewna to minimalna wiedza, jakiej dostarcza formalizm matematyczny teorii odzwierciedlający obserwowane empirycznie relacje przyczynowe. Teorie naukowe mogą jedyne ujawnić strukturę nieobserwowalnego świata na podstawie własnej struktury matematycznej. Ich równania matematyczne, które zostają zachowane po zmianie teorii, wyrażają rzeczywiste relacje między bytami, o których nie wiemy nic więcej, jak tylko to, że pozostają one w tych matematycznie wyrażonych relacjach. Różne ontologie (a zatem różne interpretacje teoretyczne) mogą odpowiadać tej samej strukturze matematycznej, nie ma jednak podstaw, aby jedną z nich uznać za lepiej uzasadnioną niż inne. Z drugiej strony realizm strukturalny pokazuje i podkreśla wartość poznawczą samych takich struktur, nawet przy niepewności co do poprawności ich interpretacji. Wiedza na poziomie strukturalnym jest możliwa także wtedy, gdy pozostaje nierozpoznana ontologiczna natura zjawisk.

Jako rozwinięcie i dopełnienie realizmu strukturalnego o problematykę przedmiotów teoretycznych, które realizm strukturalny usuwa poza granicę poznania, A. Chakravartty proponuje stanowisko, które określa jako semirealizm. Dowodzi, że przyjęcie realizmu strukturalnego ma konsekwencje odnośnie do istnienia i własności obiektów teoretycznych wyznaczających relacje przyczynowe odzwierciedlane przez równania. Występowanie relacji pociąga za sobą wniosek, że jakieś argumenty tworzą te relacje. Wykazuje on, że „wiedza o strukturach implikuje wiedzę zarówno o istnieniu bytów spełniających te struktury, jak i o ich niektórych właściwościach detekcyjnych”[36].

Chakravartty, argumentując na rzecz realności przedmiotów charakteryzowanych przez własności detekcyjne, nawiązuje do

36 A. Chakravartty, *Semirealism*, dz. cyt., 392.

stanowiska I. Hackinga, który utrzymuje, że własności przyczynowe nieobserwowalnych obiektów teoretycznych ujawniające się w trakcie empirycznej manipulacji tymi obiektami, są dowodem ich realnego istnienia. Gdy jakieś przedmioty teoretyczne zostaną empirycznie wykryte w ramach jednej teorii, zostają zachowane także w kolejnych teoriach po niej następujących. Np. termin „elektron", występujący w teoriach Thomsona, Lorentza, Milikana, Bohra, odnosi się w każdej z tych teorii do tej samej realnej cząstki, mimo że jego teoretyczna treść ulegała zmianie od teorii do teorii[37].

Chakravartty uznaje własności leżące u podstaw relacji przyczynowych, o których mówi Worrall, za argument na rzecz realności przedmiotów, którym się je przypisuje. Przypisywane przedmiotom teoretycznym własności dzieli na własności detekcyjne i pomocnicze i twierdzi, że własności detekcyjne są bezpośrednio powiązane z doświadczeniem i służą do empirycznej interpretacji równań matematycznych. Własności pomocnicze natomiast odgrywają rolę heurystyczną w teoretycznym wyjaśnianiu zjawisk i nie są konieczne ze względu na odkrywane prawidłowości obserwowanych zjawisk. Mogą one być odrzucone w przyszłych teoriach lub stać się własnościami detekcyjnymi. Własności detekcyjne niezbędne do minimalnej interpretacji równań matematycznych stanowią wiedzę na temat obiektów generujących struktury relacyjne wskazywane przez Worralla.

Worrall i Chakravartty, uwzględniając fakt zmiany teorii w nauce, dowodzą, że prawdziwe są nie całe teorie, a tylko ich wybrane elementy, bezpośrednio powiązane z sukcesem predykcyjnym tych teorii. W przeciwieństwie do realizmu naukowego realizm strukturalny ogranicza poznawczą treść teorii naukowych do ich struktury matematycznej wraz z ich empirycznymi konsekwencjami. Różni się jednak od instrumentalizmu tym, że sugeruje, iż matematyczna

37 I. Hacking, *Eksperymentowanie a realizm naukowy*, tłum. z ang. D. Sobczyńska, w: *Spór o realizm naukowy*, dz. cyt., 29-65

struktura teorii rzeczywiście odzwierciedla strukturę świata (tj. odzwierciedla rzeczywiste relacje między nieobserwowalnymi przedmiotami).

Chakravartty natomiast wiąże z realnością pewnych relacji przyczynowych realność przedmiotów konstytuujących te relacje. Semirealizm przyjmuje realność przedmiotów stanowiących minimalną interpretację teorii, tzn. takich, na które wskazują ich własności detekcyjne bezpośrednio występujące w równaniach odpowiedzialnych za sukces teorii. Odrzuca jednak realność obiektów takich, jakimi przedstawiają je teorie, ograniczając przedmioty do wiązki własności detekcyjnych. Jest jednak kwestią otwartą, na ile wiązka własności detekcyjnych wykracza poza przedmiot obserwacyjny oraz w jakim stopniu zależy ona od teorii.

Konsekwencje zarówno realizmu, jak i semirealizmu odnośnie do realistycznego wyjaśnienia zmian teorii w nauce, w szczególności zmiany teorii Fresnela na teorię Maxwella w optyce, budzą jednak pewne wątpliwości. Zdaniem Worralla eter nie narusza aproksymacyjnej prawdziwości teorii Fresnela, ponieważ nie jest reprezentowany w jej matematycznym formalizmie. Natomiast zdaniem Chakravartty'ego, nie należy on do minimalnej interpretacji teorii. Pozwala im to uznać teorię Fresnela za aproksymacyjnie prawdziwą teorię światła. Taka konkluzja budzi zastrzeżenia i wymaga dopowiedzenia, w jakim sensie i w jakim zakresie teoria Fresnela może być uznana za aproksymacyjnie prawdziwą. Rozwój fizyki odrzucił teorię światła jako drgań eteru za fałszywą, akceptując jednak falową naturę światła. Problem ten jest wciąż przedmiotem ożywionej dyskusji[38].

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38 Por. np. J. Saatsi, *Reconsidering the Fresnel-Maxwell theory shift: how the realist can have her cake and EAT it too*, Studies in History and Philosophy of Science 36(2005)3, 509-538

4. TRUDNOŚCI REALIZMU STRUKTURALNEGO I KIERUNKI JEGO ROZWOJU

Na jedną z łatwiej dostrzegalnych trudności odniesienia realizmu strukturalnego do obecnych dojrzałych teorii wskazuje Chakravartty. Jest nią konsekwencja w postaci możliwości poznania aproksymacyjnie prawdziwych elementów jednej teorii dopiero z perspektywy jej następczyni, są to bowiem te równania teorii, które zostają zachowane przy jej zmianie. Nie jest to jednak cały aparat matematyczny teorii. Np. w teorii Fresnela obok równań, które stały się częścią teorii Maxwella, było wiele matematycznych sformułowań praw dotyczących samego eteru i jego oddziaływania z materią. Wszystkie one zostały odrzucone jako fałszywe. Realizm strukturalny nie określa warunków, które w ramach danej teorii identyfikowałyby te elementy jej formalizmu matematycznego, które zostaną zachowane. Zdaniem Chakravartty'ego semirealizm oferuje takie kryterium. Jest nim ograniczenie się do równań opisujących związki między własnościami detekcyjnymi. Według Chakravartty'ego przedmioty wyposażone we własności należące do minimalnej interpretacji równań teorii pozostają w teorii następnej i zachowują swoje własności detekcyjne[39].

Juha Saatsi twierdzi jednak, że semirealizm, choć słusznie różnicuje własności detekcyjne i pomocnicze ze względu na ich konsekwencje dla realistycznej interpretacji obiektów teoretycznych, to zbyt powierzchownie ujmuje funkcję wyjaśniającą teorii i uwikłanie obu wyszczególnionych rodzajów własności w spełnianie tej funkcji. Np. w wypadku teorii Fresnela własności detekcyjne pozwalają ustalić związki formalne rozchodzenia się fali, nie odzwierciedlają jednak natury rozchodzących się drgań. Tymczasem Fresnel w swoim wyprowadzeniu odwoływał się do tej natury, zakładając ciągłość energii i pędu w drganiach eteru. Odwoływał się także do nieobserwowalnych amplitud tych drgań i ich składowych, wiążąc

39 A. Chakravartty, *Semirealism*, dz. cyt., 404-405.

je z natężeniem promienia świetlnego. Własności eteru pełniły więc zarówno heurystyczną, jak i wyjaśniająca funkcję w teorii Fresnela i nie sposób oddzielić ich od własności detekcyjnych w kontekście tej funkcji[40].

Obok zasygnalizowanych powyżej trudności, stanowiących bezpośrednie konsekwencje przyjęcia tez realizmu strukturalnego, do których należy ograniczenie realistycznego traktowania postulowanych przez teorie przedmiotów (jak w wypadku realizmu strukturalnego Worralla) lub ograniczenie ich do wiązki własności detekcyjnych (jak w wypadku semirealizmu), można wskazać mniej bezpośrednie, lecz istotne z perspektywy realizmu naukowego konsekwencje ujęcia strukturalistycznego, do którego można zaliczyć oba stanowiska i ich odwołania do kumulatywizmu w roli kryterium aproksymacyjnej prawdziwości.

Odwołanie się do kumulatywizmu jako naczelnej podstawy dla określenia aproksymacyjnej prawdziwości teorii pociąga za sobą określone założenia i w konsekwencji zmienia koncepcję prawdy, do jakiej tradycyjnie odwołuje się realizm naukowy (epistemologiczny). Idea kumulatywizmu leży u podstaw strategii *divide et impera*, zgodnie z którą części teorii związane z sukcesem teorii są zachowane w jej następczyni ze względu na ich aproksymacyjną prawdziwość. Trudnością tego stanowiska jest nie tylko fakt, że aproksymacyjnie prawdziwe fragmenty teorii zostaną rozpoznane i wyodrębnione dopiero, gdy zostanie ona zastąpiona nową. Ważniejsze wątpliwości budzi założenie, że zachowanie części starej teorii w jej następczyni staje się kryterium prawdziwości tej pierwszej. Zatem nie relacja pomiędzy teorią i rzeczywistością, a relacja pomiędzy teorią i jej następczynią jest podstawą uznania jej za aproksymacyjnie prawdziwą. Jest to zastąpienie klasycznego rozumienia prawdy koncepcją prawdy relatywnej, polegającej na zgodności części teorii z inną, następującą

40 J. Saatsi, *Reconsidering the Fresnel-Maxwell theory shift: how the realist can have her cake and EAT it too*, dz. cyt., 517-520.

po niej teorią. U podstaw tej relatywizacji leży założenie, że aproksymacyjnie prawdziwe części teorii mają być zachowane w kolejnej teorii, również aproksymacyjnie prawdziwej. Dopóki jednak nie możemy przypisać aproksymacyjnej prawdziwości obecnym teoriom (co, zgodnie z takim rozumieniem, można uczynić dopiero z perspektywy nieznanych dziś kolejnych teorii), to nie możemy także określić aproksymacyjnej prawdziwości ich poprzedniczek. Nie następuje porównanie przeszłej teorii z obecną teorią, która jest aproksymacyjnie prawdziwa, lecz z obecną teorią o nieznanej wartości logicznej. Sam kumulatywizm, o którym założono, że jest wynikiem prawdziwości części teorii, nie jest jej warunkiem wystarczającym. Klasyczne rozumienie prawdy odsyła do relacji teorii i zjawisk, niezależnie od jej stosunku do innych teorii. Konieczne jest poszerzenie stanowiska realistycznego o koncepcję aproksymacyjnej prawdziwości wolną od takiego relatywizmu.

Dalsze istotne trudności obu stanowisk związane są z podstawowym dla nich strukturalistycznym (semantycznym) ujęciem teorii naukowych[41]. Zakładając, że równania matematyczne reprezentują strukturę świata, Worrall nie wyjaśnia, jak jest możliwe reprezentowanie świata w strukturach matematycznych. Według van Frassena jest to podstawowe wyzwanie dla realizmu strukturalnego[42].

Realizm strukturalny przyjmuje semantyczne ujęcie teorii naukowych, zgodnie z którym teorie są równoważne rodzinie modeli, będących abstrakcyjnymi strukturami (np. matematycznymi), w których spełnione są aksjomaty teorii. W wypadku teorii empirycznych,

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41 Podejście takie spośród omawianych autorów przyjmują np. J. Worrall, A. Chakravartty i B. van Fraassen. Według tego podejścia teoria naukowa jest w pierwszej kolejności identyfikowana z rodziną modeli w sensie struktur matematycznych, za pomocą których reprezentowana jest dziedzina zjawisk, będąca jej przedmiotem. Szersze omówienie np. w: F. Suppe, *The Semantic Conception of Theories and Scientific Realism*, Urbana 1989, jak również w: A. Grobler, *Metodologia nauk*, Kraków 2008, 178-191.

42 B. van Frassen, *Representation: The problem for Structuralism*, Philosophy of Science 73(2006)5, 536-547.

matematyczne modele teorii reprezentują zjawiska empiryczne. Przyjmowane w tym podejściu pojęcie reprezentacji jako odzwierciedlania struktur rzeczywistości w strukturze zjawisk w sensie izomorficznego odwzorowania pomiędzy strukturami niesie trudności związane z określeniem struktury zjawisk. Realistyczna interpretacja/koncepcja reprezentacji zjawisk w strukturach matematycznych jest niezbędnym uzupełnieniem realizmu strukturalnego. Jak zauważa Psillos, realizm strukturalny potrzebuje niezależnego argumentu, że równania matematyczne reprezentują strukturę świata. Dopiero wtedy ich zachowanie w nowej teorii daje uzasadnienie, że zastąpiona teoria reprezentowała tę strukturę poprawnie[43]. Poszukiwanie związku równań matematycznych z reprezentowaną rzeczywistością zjawisk prowadzi do wyłonienia pośrednika pomiędzy równaniami matematycznymi i strukturą zjawiska w postaci modelu danych. Przyjęcie ciągu reprezentacji, gdzie równania teorii (model matematyczny) reprezentują model danych (również matematyczny), a ten dopiero reprezentuje zjawiska, przenosi ciężar pytania o reprezentację rzeczywistości w równaniach matematycznych na wykazanie związku modelu danych z realnymi zjawiskami. Uzupełnienia o wyjaśnienia reprezentacji zjawisk w modelu danych potrzebuje zarówno realizm strukturalny, jak i semirealizm. Semirealizm, wprowadzając własności detekcyjne, pośrednio zakłada ich związek (lub tożsamość) z modelem danych. Pozostaje jednak do wyjaśnienia ich rola w reprezentacji świata w teorii naukowej. Bez uzupełnienia o teorię reprezentacji pozwalającą wyjaśnić związek teorii z realnymi zjawiskami, do których się ona odnosi, ani realizm strukturalny, ani semirealizm nie dają uzasadnienia realizmu naukowego wolnego od wątpliwości.

43 S. Psillos, *Scientific Realism: How Science Tracks Truth*, dz. cyt., 146.

5. ZAKOŃCZENIE

Pytanie o możliwość obrony realizmu naukowego wobec dokonujących się w nauce zmian teorii, stanowiło oś powyższych rozważań. Zarówno próby formalnego podważenia lub osłabienia argumentu na rzecz realizmu naukowego, jak i próby uchylenia na takiej drodze zarzutu PI, odsłoniły potrzebę doprecyzowania sformułowań obu argumentów, nie przyczyniły się jednak do ostatecznego unieważnienia któregoś z nich.

Próby uzgodnienia stanowiska realistycznego z argumentem PI doprowadziły do znacznego zawężenia i osłabienia tez realizmu naukowego. Główne stanowiska, które formułują takie odpowiedzi, czyli realizm strukturalny (zapoczątkowany przez J. Worralla, a następnie rozwijany w wersji ontologicznej i epistemologicznej przez kolejnych autorów) oraz semirealizm Chakravartty'ego, choć dostarczają pewnej interpretacji zmiany teorii z perspektywy realizmu naukowego, to znacznie osłabiają jego główne tezy. Ograniczają aproksymacyjną prawdziwość teorii naukowych do ich części bezpośrednio związanych z sukcesem teorii i zachowanych w ich następczyniach. Realizm strukturalny dodatkowo ogranicza się tylko do struktur matematycznych teorii, uznając jej ontologię za niepoznawalną. Stanowi to odrzucenie tezy realizmu, że terminy teoretyczne dojrzałych teorii mają realne odniesienia. Zgodnie z realizmem strukturalnym nie mamy poznawczego dostępu do obiektów leżących u podstaw relacji tworzących te struktury. Semirealizm jest pod tym względem mniej restrykcyjny i interpretuje realistycznie istnienie „nośników" własności detekcyjnych, leżących u podstaw sformułowania prawidłowości matematycznych. Pozostawia jednak niewyjaśnioną kwestię związku przedmiotu wskazanego przez własności detekcyjne jednej teorii z realnym przedmiotem i jego tożsamości z przedmiotem wyznaczonym, na podstawie wartości detekcyjnych właściwych dla innej teorii.

Inną ważną konsekwencją tych stanowisk jest rozumienie kluczowego pojęcia aproksymacyjnej prawdziwości teorii naukowych w sposób zrelatywizowany do kolejnych teorii, które zastępują je w rozwoju nauki.

Stanowiska będące główną obroną realizmu naukowego, przyczyniły się też do ograniczenia wersji realizmu naukowego, jaką był realizm konwergentny. Celem tego ograniczenia było zachowanie i obrona samej jego podstawy, głoszącej, że nauka w jakimś stopniu dociera poznawczo do realnego świata i część tej wiedzy bywa prawdziwa. Odsłaniają one jednak dalsze wyzwania, na jakie realizm naukowy musi odpowiedzieć. Do najważniejszych z nich należy problem reprezentacji zjawisk w strukturach matematycznych, jakimi są równania teorii i modele danych, oraz określenie aproksymacyjnej prawdziwości teorii naukowych, wolnej od relatywizmu względem innej teorii. O te kwestie zarówno realizm strukturalny, jak i semirealizm powinny być uzupełnione. Rozwinięcie tych problemów wymaga jednak odrębnego opracowania.

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SCIENTIFIC REALISM AND THEORY CHANGE IN SCIENCE

Abstract. An important part of the contemporary dispute between scientific realism and anti-realism is an attempt to give a realistic interpretation to the historical facts of the theory change in science. According to L. Laudan, this fact undermines not only the most important argument for scientific realism but also the most important theses of this position. The argument contested by Laudan is the H. Putnam's claim that the huge success of science in predicting novel phenomena and developing new technologies proves at least the approximate truth of scientific theories. Laudan, however, shows facts from the history of science when successful theories have turned out to be false over time. A related argument against realism called Pessimistic Induction (PI). According to PI, since previous theories that had been successful turned out to be false from the perspective of newer ones, also current successful theories may turn out to be false in the future. This undermines the thesis that the predictive success of a theory is related to its approximate truthfulness. Therefore, an important challenge for scientific realism is to reconcile its theses with the facts of theory change in science. The most significant solutions to this problem are provided by structural realism proposed by J. Worrall and semirealism by A. Chakrawartty. Both positions adopt the same strategy of defending realism known as *divide et impera*, stating that not all theories, but only parts of them that are directly related to success, meet the theses of realism. Scientific realism in these formulations is largely limited and weakened. The aim of the article is to present these solutions and show, on the one hand, realistic answers to the PI argument provided by these positions, and on the other hand, the limitations that result from them for scientific realism. The weakened version of realism they propose is also not free from significant difficulties to which both

structural realism and semirealism must respond. The identification of these difficulties may be helpful for the further development of the realistic position.

Keywords: scientific realism; convergent realism; structural realism; semirealism; approximate truth; *divide et impera* strategy

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METAPHORS AND METAPHORICAL LANGUAGE/S IN RELIGION, ART AND SCIENCE

Abstract. Languages play an essential role in communicating aesthetic, scientific and religious convictions, as well as laws, worldviews and truths. Additionally, metaphors are an essential part of many languages and artistic expressions. In this paper I will first examine the role metaphors play in religion and art. Is there a specific focus on symbolic and metaphoric language in religion and art? Where are the analogies to be found in artistic metaphors and religious ones? How are differences to be described? How do various (philosophical) concepts of aesthetics and theological concepts explain those different kinds of language and how, if at all, do they make use of them? Lastly: what could be added to aesthetics, philosophy and theology by examining carefully the role and importance of language, including nonverbal, sign language and especially metaphorical language? Without the human capacity for language, religions are scarcely imaginable. A widening of traditional exegesis and hermeneutics by taking into account nonverbal semantics is needed. Religion is a cognitive and linguistic phenomenon. By taking this seriously, we set and enable an agenda to discuss religion scientifically, leaving aside for the purpose of a scientific understanding and discourse about the inter-religious and the inner-religious claims of truth and absolutist claims. To sum it up: metaphor is introduced as an important means of language when it comes to religious conceptualization. Next, I will show that art, more than religion, deals with visual metaphor – the latter being an image that suggests a particular association, similarity or analogy between two (or more) generally unconnected visual elements. This often, but not always, functions in a roughly comparable fashion to the better-known concept of verbal metaphor. In addition, visual metaphor has developed many original and unique characteristics. These two sections are followed by another one dealing with (inter)cultural philosophy of religion and aesthetics, as well as the meaning of metaphors for these disciplines. The next section is on metaphor and metaphorical language in mathematics, natural sciences and art and how they are related, i.e. influence and help each other. I will discuss the critical approach to metaphors in natural science and provide a short introduction to the cultural history of mathematics and art. Mathematicians and artists have long been on the quest to understand the physical world they see before them and the abstract objects they know by thought alone. How have art and mathematics helped each other in representing each other's concepts? A final section provides a summary and an outlook: theology is contextual as is science – and so is art. All these disciplines partly rely upon metaphor and by the help of metaphor get

closer to an intercultural and interdisciplinary understanding. I shall argue that, by dealing more carefully with their metaphorical language and their own metaphors, together they become better equipped to map the world.

Keywords: metaphor; metaphorical language; cognitive science; neurobiology; theology; hermeneutics; intercultural philosophy; interdisciplinary discourse

1. INTRODUCTION

Is there a mutual relation between natural sciences, philosophy and theology? Despite the controversies, there is a general consensus among researchers to seek a common platform for dialogue to build a coherent view of the world. But what areas are involved in such a dialogue and what might be its outcomes and perspectives?

As a theologian and philosopher (of religion), in this paper I would like to examine the inner – and interdisciplinary outcomes and perspectives that result when theologians, philosophers, mathematicians, artists and scientists discuss the role of metaphor and metaphorical language/s in their respective fields. Is there a chance that metaphors function as "bridge builders" between them, as "tools of interdisciplinary hermeneutics", so to speak?

2. LANGUAGE, SIGNS AND METAPHORS

First of all, we have to remember that language and languages play an essential role in communicating aesthetic, scientific and religious truths, as well as laws and regulations. We are therefore well advised to interpret and understand the language(s) of the aesthetic, scientific and religious systems we want to communicate with for the sake of a mutual understanding. In doing so, we must also deal with signs,

symbols and metaphors which play a constitutive role in their different languages. On the other hand, if we want to be understood inter-confessionally, interreligiously, interculturally and interdisciplinary, we have to try hard to learn more about our own language system(s) and be aware of their shortcomings and blind spots as well as the inherent causes of misunderstanding. We should also try to develop them in order to be better understood by those who are not genuinely familiar with our beliefs, thoughts and discipline, i.e. our linguistic specialities expertise and its specific contextual elements.

Let us take metaphors here as a form of pictorial representation, which conveys a new and important message or "truth" in a context of meaning different from the original one. Symbols on the other hand always represent the same thing and convey the same meaning or truth. Carl Jung's ideas on symbols, for example, relate to his notion of archetypes. In this sense, symbols are culturally specific but also deeply personal.

"The differences between a metaphor and a symbol in art is demonstrated by comparing a pair of paintings. Sandro Botticelli painted *La Primavera* in 1482, while Hans Holbein the Younger painted *The Ambassadors* in 1533. *La Primavera* is ostensibly about spring using a cast of mythological beings. *The Ambassadors*, on the other hand, is about a meeting between Jean de Dinteville and Georges de Selve. On the surface *La Primavera* provides like for like substitutions of mythological figures for spring. It also may hark back to ideas concerning the blossoming of the whole world and the Garden of Eden. Others, such as Marsilio Ficino, see it as a metaphor for neoplatonic love. The difference between a metaphor and a symbol here is that the whole painting is one metaphor or allegory. *The Ambassadors* uses symbols to provide additional information concerning who the figures are and the story behind their meeting. It does not attempt to tell a second story, but to provide additional information. For example, the lute next to Georges de Selve's knee is a symbol of peace, but the cord is broken to symbolize discord.

Metaphors can form parts of narrative. A long metaphor is known either as an extended metaphor or as an allegory. Films, poems and novels can include symbols, but only metaphors are used as a narrative device. Sometimes entire films, poems and novels are metaphors."[1]

In addition to that, it is important to remember, especially for hermeneutics (of religion), that the word "symbol" has its roots in the Greek word *symballein* ("to throw together"). More specifically, in Christianity a symbol sometimes "represents" the intertwining of human and divine, of material and non-material – coming close to the meaning and role sacraments play in liturgy and theology.

As for signs – sometimes also called symbols in a narrow sense – they are often graphical presentations. The main difference being that a sign is a language of its own and specifically meant to communicate certain information. To sum it up: signs are usually informative, regulatory, warning or prohibitory. A sign ought to be followed as it is. Therefore, many signs have a universal meaning shared by people from various backgrounds.

To the contrary, a symbol "… is a something that is accepted by certain group of people or general population. It can be interpreted differently by people from different backgrounds. A cross is an example of symbol that has been universally accepted as representing Christianity."[2] This means that a symbol is the form of a sign that may have deep meaning. It can be interpreted in different ways since its meaning may not be universally shared by different people.

Let us now once more get back to metaphors and their close relation to simile and analogy. A different definition of metaphor is that it is a figure of speech that uses one thing to mean another and makes a comparison between the two. A simile, which can be

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1 M. Wollacott, *What Is the Difference between a Metaphor and a Symbol?*, (https://www.wisegeek.com/what-is-the-difference-between-a-metaphor-and-a-symbol.htm), [accessed 09/2020].

2 M. Trevor, *Difference between Sign and Symbol*, (http://www.differencebetween.net/miscellaneous/difference-between-sign-and-symbol/), [accessed 09/2020].

defined as one type of metaphor, compares two different things in order to create a new meaning. "An analogy is comparable to metaphor and simile in that it shows how two different things are similar, but it's a bit more complex. Rather than a figure of speech, an analogy is more of a logical argument. The presenter of an analogy will often demonstrate how two things are alike by pointing out shared characteristics, with the goal of showing that if two things are similar in some ways, they are similar in other ways as well. A metaphor carries so much more power than a simile, because it's *direct*. Using 'like' or 'as' to make an open comparison will often diminish the vivid visual you're trying to paint in the reader's mind. Likewise, a spot-on metaphor will spark instant understanding for a reader, without the elaboration that an analogy requires."[3]

It seems that, because of their rather strong subjectivity or even "otherworldliness" symbols and symbolic language in a broader sense are particularly difficult to interpret when it comes to promoting a mutual understanding between science, religion and art, to compare and understand better their explanations of the world. On the other hand, in natural science or mathematics we find many signs, some of them close to analogies and metaphors, but almost no symbols (unless we use the term in its narrow sense introduced above, which makes "symbol" analogous with the term "sign").

If we want to get as close as possible to using similar concepts and explanations of the world in religion/theology, art/aesthetics and natural science/mathematics, we are therefore well advised to conform to their use of metaphors and investigate how they are used and what they mean in religion, art and science/s.

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3 B. Clark, *Metaphor, Simile, and Analogy: What's the Difference?*, (https://copyblogger.com/metaphor-simile-and-analogy-whats-the-difference/), [accessed 09/2020].

3. METAPHORS AND METAPHORICAL LANGUAGE IN RELIGION – THEOLOGICAL OUTCOMES AND IMPLICATIONS

I shall now examine the role metaphors play in religion: is there a specific focus on symbolic and, for our purposes, metaphoric language in it?

As argued in the first section, it is quite clear that without the human capacity for language, religions are scarcely imaginable. On the one hand it has become clearer and clearer that traditional exegesis and hermeneutics need to take into account nonverbal semantics. The use of non-textual and nonverbal sources can promote and facilitate intercultural exchange. On the other hand, metaphorical language has become increasingly more important in order to understand the "mechanisms" of religious narratives and rituals. Therefore, religion – at least to a certain extent – is a cognitive-linguistic phenomenon. This enables an interdisciplinary agenda for a scientific debate on religion, leaving aside inter-religious and inner-religious claims of truth and absolutist claims.

Linguistics (which I take to belong to natural science) exists externally as bodily and linguistic practices and internally as experiences, mental operations, and emotions in the mind-brain, "…interacting internally in a complex relationship and externally with other brain-minds, often but not always in particular spatial and social settings."[4] In this respect religion can be understood as a product of the human mind. Therefore, a cognitive-linguistic anthropology of religion is needed, not least to explain religious rituals and give a cognitive and linguistic account of them. On the other hand, natural science and religion are getting rather close – this is a starting point for a better interdisciplinary understanding.

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4 *Religion, Language and the Human Mind*, eds. P. Chilton, M. Kopytowska, Oxford University Press, New York 2018, xvii.

This is particularly important as (intercultural) theology is more and more interested not only in social and cultural history, hermeneutics and anthropology, but also in the human brain (as studied in neuroscience) and human consciousness (as studied in cognitive science). Therefore, metaphor is and has to be introduced as an important linguistic tool when it comes to religious conceptualization.

4. METAPHORS AND METAPHORICAL LANGUAGE IN ART – AESTHETICS RE-ACTING

Art, more than religion, deals with visual metaphor – the latter being "… an image that suggests a particular association, similarity or analogy between two (or more) generally unconnected visual elements. This often functions in a roughly comparable fashion to the better-known concept of verbal metaphor, but not always, and visual metaphor has developed many of its own unique characteristics. This 'presence', whether 2D, 3D, filmic or whatever, is primarily optical. It is a nonverbal embodiment of a conceptual metaphor. As Noël Carroll describes it, visual metaphors 'prompt insights' in the viewer by depicting 'noncompossible' (generally impossible to combine) elements in a 'homospatially unified' image."[5]

It follows from this that optical tropes should be understood as having a heuristic value in themselves, rather than as representations of a previously unknown entity, for example a deity, etc. "In cognitive metaphor theory, this would be described as an imagistic *target* compared pictorially to some visual thing from another category, the *source*. (In I.A. Richards's language, the *tenor* and *vehicle*, respectively.)"[6] The formal, technical and stylistic aspects become

5 M.S. Brandl, *Dr Great Art Episode 42: Defining of Visual Metaphor,* (http://brandl-art--articles.blogspot.com/2018/09/dr-great-art-episode-42-defining-of.html), [accessed 09/2020].

6 Ibid.

as important as pictorial, representational images. Visual tropes can be seen as a thought process, involving the fact that metaphors are embodied. "The discovery animating all of this is that trope is the basis of thought, thus language is one instance of it, not the other way round."[7]

By using these insights from aesthetic metaphor theory in practical and systematic theology, we could for example gain a new and better understanding of the Eucharist. Let us take the "function of the Eucharist" as a sort of "metaphorical game" that can help us to "playfully" learn about the Reign of God. We then realize that in ritualized movements, the setting of the altar, the elevation of bread and wine, etc., we have a means for the theologically, philosophically (and aesthetically) untrained person to "experience" what a long, theoretical explanation would call a "real presence" and, inclusively, the trinitarian doctrine and certain aspects of the doctrine of the two natures. The eucharist then becomes, to a certain extent, "understandable" to lay persons and even to non-Christians and non-believers. In general, "noncompossible" elements which constitute a sacramental event become "metaphorically understandable" in a "homospatially unified" image.

If visual tropes (and embodied metaphors) can be seen as a thought process, some "religious mysteries", which so far seemed to be best explained by paradoxical language, could be "understood" by artistic visualization followed by aesthetic and theological interpretation.

The artistic, nonverbal embodiment of a conceptual metaphor (and art in general) could therefore not only help "prompting insights" in the viewer by depicting "noncompossible" elements in a "homospatially unified" image, but art could also function as a "bridge builder", enabling religion by representing a previously unknown entity (symbol), a deity for example, and helping theology to "explain" religious insights and/or convictions to the secular mindset and to

7 Ibid.

people from other cultural and religious backgrounds (metaphor). The possibility to improve the mutual understanding between church and world, religion and religion and theology, philosophy and science is growing.

5. (INTER)CULTURAL PHILOSOPHY OF RELIGION AND AESTHETICS

Intercultural philosophy takes culture and intercultural exchange seriously when it comes to questions of the ultimate reality or the final truth and global ethics. Here I use the term 'intercultural philosophy' to characterize a specific philosophical tradition which explicitly considers different philosophical cultures ("interculturality").

There are three main lines of arguments – with different methodological, empirical, scientific and epistemological problems and a specific terminology: (1) with a strong comparative element, closely connected with the search for an intercultural hermeneutics and "cultural overlapping"; (2) with a strong emphasis upon the history of philosophy, pointing out the different "birth places" of philosophy; and (3) the one trying to interculturally transform philosophy.[8]

Intercultural philosophy started between the end of the 1980s and the beginning of the 1990s, partly as a reaction against economic and political globalization and its tendency to unify cultures; and partly as a reaction against the rise of cultural conflicts and the so-called "clash of civilization".[9]

Philosophy and theology had to recognize the contextuality of thought and belief and to deal anew with the question whether this excludes universal truths and universality. This led to a search for "transcultural overlapping" and a transcendental and transcultural

8 R.A. Mall, *Essays zur interkulturellen Philosophie*, T. Bautz 2003, 39-43

9 S.P. Huntington, *The Clash of Civilizations and the Remaking of World Order*, Simon and Schuster, New York 1996.

philosophy or theology, i.e. philosophy of religion – a branch of interreligious and pluralist theology.

The expression "Verleichende Religionswissenschaft" (comparative religious studies) was first used for a merely secular and phenomenological, i.e. epistemological, approach; its comparative aspect was taken up especially by what has recently developed as comparative theology, which distinctively stresses its Christian heritage. In some pluralist or interreligious theologies the possibility of a "neutral scientific" access is seriously doubted. This, however, does not lead comparative theologians towards a transcultural model (see above).

Klaus von Stosch, a comparative theologian, states: „Es geht der komparativen Theologie nicht um Allgemeinaussagen über die Wahrheit einer oder mehrerer Religionen, sondern um das Hin – und Hergehen zwischen konkreten religiösen Traditionen angesichts bestimmter Problemfelder, um Verbindendes und Trennendes zwischen den Religionen neu zu entdecken."[10] The issue here is to bind together the truth claim of one's own faith with a respectful appreciation of other religions. „Das religionstheologische Urteil wird gleichsam aufgeschoben, um der Bewährung im Einzelfall bzw. in vielen Einzelfällen Platz zu machen."[11] The recent debate between a so-called *pluralist* or interreligious theology and a *comparative* or intercultural theology or philosophy is also a debate about different ways to emphasize commonalities and differences, a truth which is undividable and absolute or rather manifold and "in the making".

I prefer the term intercultural theology or intercultural philosophy in order to avoid any metaphysical and absolutist claim – by way of providing a definition, independently of any missiological or

10 K. von Stosch, *Komparative Theologie – ein Ausweg aus dem Grunddilemma jeder Theologie der Religionen?*, 9, (https://kw.uni-paderborn.de/fileadmin/fakultaet/Institute/kath-theologie/Systematische_Theologie/Prof._Dr._Klaus_von_Stosch/Publikationen/3._Artikel_Articles/4._Komparative_Theologie.pdf) [accessed 09/2020].

11 F. Eissler: *Komparative Theologie – Eine Alternative zu bisherigen religionstheologischen Konzepten?*, (http://www.reformiert-info.de/7918-0-56-7.html) [accessed 09/2020].

inclusivist approach. In the sense used here "inter" characterizes a discursive approach towards reality and truth yet to be achieved, aimed at establishing a (non-Eurocentric) dialogue between different cultures and philosophical positions. This is not meant "to correct a postmodern fragmentation of reason", to overcome a cultural relativism based upon a more isolationist understanding of culture, or to create a synthesis of philosophical traditions. Rather, the task of "mediating" between cultures and traditions and their "unique" terminologies, questions and solutions is to be understood in a dialectic, not metaphysical sense. I suggest to start from an open concept of reason, since my view is that every reasonable approach is also dependent on context, situation and individuality.[12]

Once again, art can be very helpful here as a bridge-builder or intermediator. In addressing religious topoi explicitly or implicitly, sometimes even different ones in the same painting, an "aesthetic dialogue" takes place and the "unity of diversity" is getting a new sense and metaphorical meaning. Art does not create metaphysical synthesis since aesthetically it always only suggests, neither does it stick to fragmentation since it aims at a (pictorial) "composition".

Intercultural philosophy of religion and aesthetics then use metaphors and metaphorical language in art to improve metaphorical meaning and explanation with respect to the topoi of interreligious, intercultural and interdisciplinary dialogue.

6. METAPHORS IN NATURAL SCIENCE (AND ART)

Let us now ask whether there is something like (symbolic and/or) metaphorical language in *natural science* and, if so, how it works.

12 H.R. Yousefi, *Interkulturalität. Eine interdisziplinäre Einführung*, WBG, Darmstadt 2011; H.R. Yousefi, *Grundbegriffe der Interkulturellen Kommunikation*, UTB, München 2014.

There is a critical discussion of metaphors in the cultural history of *mathematics and art*.[13]

Mathematicians, natural scientists and artists have long been on a quest to understand the physical world they see before them and the abstract objects they know by thought alone. But is there a chance for them to understand *each other's* concepts, especially with the help of metaphors?

Lynn Gamwell points out the important ways mathematical concepts have been expressed by artists.[14] After describing mathematics from Antiquity to the Enlightenment, she focuses on modern culture and shows that self-reflection is a central aspect of both modern mathematics and art. She argues that this common introspective element highlights a deep resonance between the two fields. She further shows how mathematical ideas are embodied in the visual arts, citing cases such as David Hilbert's meaning-free signs, Aleksandr Rodchenko's monochrome paintings, Kurt Gödel's questions about the nature of mathematics and Jasper Johns' questions concerning the nature and purpose of art.[15]

Mathematics and art complement each other with respect to terminology and method. Compared to art, mathematics is much better known for its symbolic language. However, we also find a special use of metaphors in mathematics. With respect to mathematics and art we suggest a method close to the method for intercultural philosophy and theology suggested earlier: namely, to use metaphorical language in a dialectic, not metaphysical sense in

13 J. Forsey, *Metaphor and Symbol in the Interpretation of Art*, (http://www.artsrn.ualberta.ca/symposium/files/original/ff2c58ca6f0977066bdfb96433c52769.PDF), [accessed 09/2020].

14 L. Gamwell, *Mathematics and Art: A Cultural History*, Princeton University Press, Princeton 2016.

15 J. Johns, *Writings, Sketchbook Notes, Interviews*, Museum of Modern Art, New York 1996; K. Gödel, *Band 1: Philosophie I, Maximen 0 – Volume 1: Philosophy I, Max 0*, in: *Philosophische Notizbücher – Philosophical Notebooks*, ed. E.-M. Engelen, De Gruyter, Berlin – München – Boston 2019.

order to establish a dialectical discourse between art and mathematics about the world and reality. As for natural science, we suggest once again to start from an open concept of reason and a rational approach dependent on context, situation and individuality. We are thus well advised to integrate methodologically what is known as the "observer's standpoint" in natural science with what could and should be called the "hermeneutics of natural science".

I shall now give an example to illustrate how metaphors in art and natural science widen their horizon, enable them to explain a deeper insight, make them more understandable in interdisciplinary discourse and, lastly, how the encounter with the Other reforms each discipline to a certain and sometimes unexpected extent.

The language of science is often metaphorical and analogical to make sense of scientific phenomena and disseminate its findings to the wider scientific community and the general public. It is therefore especially important for scientists, science communicators, and science educators to acknowledge the conceptual, social and political dimensions of metaphors in science and adopt a critical perspective on their use and effects – metaphors here are not just seen as heuristic and rhetorical devices, but also as social and political "messengers" rooted in cultural dynamics and power relations.[16]

This is especially true of life sciences. Lakoff and Johnson have introduced the theory of *conceptual metaphor*: the nature of human cognition is metaphorical and all knowledge emerges as a result of *embodied* physical and social experiences.[17]

Metaphors are thus much more than mere linguistic embellishments. They are the foundation of thought processes and conceptual understandings aimed to map meaning from one knowledge and/or

16 C. Taylor, B.M. Dewsbury, *On the Problem and Promise of Metaphor Use in Science and Science Communication*, Journal of Microbiology and Biology Education 19(2018)1, (DOI: https://doi.org/10.1128/jmbe.v19i1.1538).

17 G. Lakoff, M. Johnson, *Metaphors We Live By*, University of Chicago Press, Chicago 1980.

perceptual domain to another. When attempting to make sense of abstract, intangible phenomena, we draw from embodied experiences and look at concrete entities to serve as cognitive representatives. For example, in the classic trope "time is money", money is the source domain, time the target domain. The trope urges us to conceptualize time as a form of currency that can be spent, invested, valued and/or wasted.

Because humans are not very good in interpreting macrocosmic and microcosmic phenomena, they rely on metaphors grounded in 'mesocosmic' experiences. A good example being Robert Hooke's description of a "cell" when the image of a piece of cork under his microscope reminded him of cells in a monastery. Another example is Kepler's account of planetary motion developed through a comparison with a clock.

Metaphors are criticized for being ambiguous and imprecise. Their general potential cannot however be ignored. (Although we also need to consider a misuse or, more generally, a "falsification" of traditional metaphors by recent scientific research.)

7. AN INTERDISCIPLINARY (INTERCULTURAL) APPROACH TO "MAP" THE WORLD – A SUMMARY AND OUTLOOK

Is there a better interdisciplinary understanding of the special languages and metaphors employed by different disciplines, such as art/aesthetics, religion/theology and natural sciences/mathematics? Where are the analogies to be found in artistic metaphors and religious ones? How are the differences to be described? Are there metaphors essentially belonging to natural sciences or mathematics? Or are they merely referring to the subjective elements of introspection and "translating" them into daily life?

As we have seen above, according to Noël Carroll visual metaphors 'prompt insights' by depicting "noncompossible" (generally impossible to combine) elements in a "homospatially unified" image. We have

also seen that there are close analogies between metaphors used in art and mathematics. And we know that there is a challenging and sometimes misleading use of mesocosmic metaphors in natural sciences, especially life sciences. (And we also had a quick look at how some mathematical ideas are embodied in the visual arts.)

As for religion, something similar is the case when theology has to deal with complicated dogmatical structures. They too can be better "understood" with the help of (artistic) metaphors. Antonio Barcelona, for example, works on metaphor and metonymy in language and art and the dogma of the Holy Trinity and its artistic representation.[18] Mihailo Antonović analyzes the metaphor of the "struggle against oneself" as elaborated in the classic Christian Orthodox book *Unseen Warfare*, tracing the cognitive, ontological and, for believers, metaphysical origins of the many metaphors occurring in Orthodox Theology.[19] Paul Clinton and David Cram concentrated on the dogma of the Eucharist and formulated new and innovative interpretations of the *hoc est corpus* through a cognitive analysis of the liturgical language involved in its celebration. With the help of modern deictic space theory, the *hoc* is investigated more closely than the 'body'. This opens new ways of understanding the meaning of 'real presence'.

If religion, as stated above, is also a cognitive and linguistic phenomenon and if therefore metaphorical language can advance a scientific understanding of religion on an intercultural and interdisciplinary level (leaving aside claims of truth and absolutist claims), religion is thereby understood as a product of the human mind, thus introducing a cognitive-linguistic anthropology of religion. Furthermore, a "religion in the brain" is also introduced, i.e. the contribution of neuroscience to an explanation of religion.

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18 *Metaphor and Metonymy at the Crossroads: A Cognitive Perspective*, ed. A. Barcelona, Mouton de Gruyter, Berlin – New York 2003.

19 M. Antonović, *Waging war against oneself: A metaphor at the heart of Christian ascetic practice*, in *Religion, Language and the Human Mind*, op. cit., 386-406.

In the process of this discussion, theology is led towards a better understanding of the meaning of the sacraments, icons, etc. Similarly, a theology based upon linguistics and metaphor theory could suggest a religious understanding of the incarnation for the visual arts in order to deconstruct a purely materialistic understanding of reality and the world as in natural science(s).

The interdisciplinary discussion of metaphors and metaphor theory in mathematics and arts can add to this a pluri-disciplinary understanding of reality and the role human beings play in this world.

As we have seen, there is an ongoing interdisciplinary discussion of language (verbal and nonverbal) and metaphor theory in art and religion, involving aesthetics and theology as well as natural science/mathematics and art. Such a discussion can help highlight analogies and important differences, leading to a better inter – and sometimes also interdisciplinary (and rational) understanding of each discipline's "efforts to map the world", to understand reality and sometimes also to get to a final truth.

"As argued by constructivists, social reality is to a large extent co-constructed by discourse."[20] Some things exist because we believe them to exist: the role of language here is to attribute functions and deontic powers, which might well be the key to the functioning of social institutions. Again, the "principle of falsification" becomes relevant in the sense that, besides all metaphysical discussions there is also a more empirical (let us also call it a more materialistic) and epistemological way of "mapping the world".

Therefore, I often speak of "verantwortete Vorläufigkeit" ("responsible interim") in hermeneutics and ethics – in this paper and other writings also in theology, aesthetics and natural science. This is paired with the suggestion to experimentally try and adjust "the principle of falsification" to theological and aesthetic methodology and may well lead to a new discussion of a de-ontological point of view I certainly

20 *Religion, Language and the Human Mind*, op. cit., 466.

see in such a "responsible interim", i.e. a "metaphysical interim" and its roots in Kantian critical idealism.

We have already discussed the explanatory (and sociological) use of metaphors in natural sciences – the opportunities and risks they afford. And, as already shown, metaphors also exist in mathematics.

To conclude, let us now investigate whether there could be "ontic reasons" for such metaphors. Mathieu Aubry argues that analogies play an essential role in mathematics: "George Lakoff and Rafael E. Núñez have shown in *Where Mathematics Comes From*[21] that our understanding of basic mathematics is deeply linked to our experience of the world. They claim that we understand mathematics through conceptual metaphors between source domains (for example spatial relationships between objects) and target domains (abstract mathematics). These metaphors are supposed to map certain basic schemata of thought, namely, cross-modal organizational structures. In fact the use of conceptual metaphor is a more general cognitive process, used not only in other sciences (as in physics or cell biology and ecology but also in every aspect of our understanding of the world, for example in philosophy and ethics."[22] But Aubry is also "… dealing with specific cases of metaphors in advanced and abstract mathematics linked to our conception of space. The goal is both to show that conceptual metaphor theory continues to apply with great success in these areas, and to try to understand the theory more deeply."[23]

Let me give one example taken from Claes Johnson: "An equation in mathematics has the form A = B, where B is not identical to A, because the equation A = A is not interesting. Thus an equation A

21 G. Lakoff, R. Núñez, *Where Mathematics Comes From: How The Embodied Mind Brings Mathematics Into Being*, Basic Books, New York 2003.

22 M. Aubry, *Metaphors in Mathematics: Introduction and the Case of Algebraic Geometry*, 1, (https://ssrn.com/abstract=1478871 or http://dx.doi.org/10.2139/ssrn.1478871), [accessed 09/2020].

23 Ibid.

= B rather expresses something like CA = CB where C is a shared aspect while A and B represent something which is different. The basic example is:

$$2 = 1 + 1$$

or:

whole = sum of parts (integral of parts per unit step)

like in:

position = sum of increments of position = integral of velocity
velocity = sum of increments of velocity = integral of acceleration.

It is clear that 'he whole' as a non-subdivided unity (like 2) is something different than 'the sum of the parts' (like 1 + 1) because the parts and the summation are visible/present in 'the sum of the parts' but not in 'the whole'. One can decompose 2 also as 2 = 0.5 + 1.5. So 'the whole' and 'the sum of the parts' share something without being identical. So what do they share? Yes, they share the number associated with 'the whole' (that is 2) and the number associated with 'the sum of the parts' (that is also 2). Thus 1 + 1 is exactly 'as big as' 2, but 1 + 1 carries an additional structure (parts and summation), which is not visible when looking merely on the size of 1 + 1. So mathematical equations are metaphors, and is it then so, like in ordinary language, that an interesting equation (metaphor) tells us something of interest? Probably. About the tenor or the vehicle? It can probably go both ways, so that something unfamiliar in something familiar gets exposed, or that something unfamiliar is made more familiar."[24]

"Something unfamiliar in something familiar gets exposed" – is that not also the case in many paintings, as well as in poetry and art in general? I am not saying that it is the only aspect and the goal of art, although very often art makes something unfamiliar more familiar

24 C. Johnson, *Towards Understanding by Critical Constructive Inquiry: What is a Metaphor, in Mathematics?*, 15 April 2010, (https://claesjohnson.blogspot.com/2010/04/what-is-metaphor-in-mathematics.html), [accessed 09/2020].

in a metaphorical way. The same is true for religious rites, parables and doctrines (e.g., the doctrine of the holy trinity or the twofold nature). Theology is contextual as is science – and all the more so is art. All these disciplines partly rely upon metaphor and with the help of metaphor get closer to an intercultural and interdisciplinary understanding. By dealing more carefully with their metaphorical language and their own metaphors, together they become better equipped to map the world.

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THE DESIGN ARGUMENT SALVAGED? ASSESSING THE CONTEMPORARY ARGUMENT FROM IMPROBABILITY

Abstract. Some features within the physical universe appear to be so well-ordered that they have been regarded as evidence of the existence of a supernatural being who has designed them. This history of the so-called design argument is millennia-long, and various formulations of the argument have been presented. In this paper, I explore one contemporary version of the design argument proposed by the Intelligent Design movement, and analyze its advantages and disadvantages in comparison to one of the most famous classical versions of the argument.

Keywords: design argument; natural theology; Intelligent Design

1. INTRODUCTION

The intuition that some features within the physical universe are so well-ordered or so appropriately serving some complex function that they must have been designed for a purpose has been one of the strongest reasons to believe that the world is governed by a supernatural being, such as the Christian God. The history of the so-called design argument reaches back to antiquity.[1] The argument was most famously promoted by British natural theologians in the 17th-19th

1 D. Sedley, *Creationism and Its Critics in Antiquity (Sather Classical Lectures 66)*, University of California Press, Berkeley – Los Angeles 2007.

centuries, when it was argued that the best explanation for the appearance of complex biological organisms was that they had been purposefully designed by God. Although biology has since shown that this complexity can be explained by the gradual development of organisms, the intuitive attractiveness of design has not disappeared. During the last twenty years, a new movement promoting the idea that it is actually possible to gain reliable empirical evidence pointing to a design in nature has emerged: the so-called Intelligent Design movement. In this paper, I review the movement's design argument and compare its advantages and disadvantages to the classical argument of British natural theologians in the light of the criticism presented against the original argument by David Hume.

2. THE INTUITION OF A DESIGN: THE ANALOGICAL DESIGN ARGUMENT

The design argument gained wide popularity in the heyday of British natural theology in the 17th through 19th centuries. Scientists (or, rather, natural philosophers or natural theologians) like John Ray[2] and William Derham[3] claimed that many features of nature clearly point to an extremely powerful designer of such features, and as Derham put it, prove the "unreasonableness of infidelity".[4] British natural theologians were not the only ones concerned with natural theology. For the purposes of this paper, however, focusing on them narrows the scope appropriately so that the topic becomes manageable, at least to some extent.

In his renowned treatise *Natural Theology*,[5] William Paley described the intuition behind the design argument by drawing an analogy

2 J. Ray, *The Wisdom of God Manifested in the Works of Creation*, R. Harbin, London 1717.

3 W. Derham, *Physico-theology, or a Demonstration of the Being and Attributes of God from His Works of Creation*, W. Innys and J. Richardson, London 1754.

4 Ibid., 428 (Book XI, Chapter III).

5 W. Paley, *Natural Theology, or Evidence of the Existence and Attributes of the Deity, Collected from the Appearances of Nature*, eds. M.D. Eddy, D. Knight, Oxford University Press, Oxford 2006.

between the design of human-made artifacts, such as a pocket watch, and the apparent design observed in the natural world. Paley illustrated the design intuition as follows, offering first an everyday example of what qualifies as a having a design: "In crossing a heath, suppose I pitched my foot against a stone, and were asked how the stone came to be there; I might possibly answer, that, for anything I knew to the contrary, it had lain there forever. … But suppose I had found a watch upon the ground, and it should be inquired how the watch happened to be in that place; I should hardly think of the answer I had before given. … [t]he inference, we think, is inevitable; that the watch must have had a maker; that there must have existed, at some time, and at some place or other, an artificer or artificers, who formed it for the purpose which we find it actually to answer; who comprehended its construction, and designed its use."[6]

Paley then drew an analogy between the design of the watch and the apparent design observed in the natural world: "[E]very indication of contrivance, every manifestation of design, which existed in the watch, exists in the works of nature; with the difference, on the side of nature, of being greater or more, and that in a degree which exceeds all computation. I mean that the contrivances of nature surpass the contrivances of art, in the complexity, subtility, and curiosity of the mechanism; and still more, if possible, do they go beyond them in number and variety."[7]

For Paley, it was self-evident that the existence of such a complex and perfectly functioning artefact as a watch would imply the existence of a designer who made it. Since many natural objects were, in Paley's view, clearly more complex and more skillfully constructed than a watch, he concluded that it could indisputably be inferred that a supernatural designer of the natural objects exists: "The marks of design are too strong to be gotten over. Design [in nature] must have

6 Ibid., 7-8.
7 Ibid., 16.

had a designer."[8] Furthermore, Paley believed that "[the] designer must have been a person. That person is God."[9]

3. HUME'S CRITIQUE AGAINST THE ANALOGICAL ARGUMENT

In his *Dialogues Concerning Natural Religion*, David Hume famously pointed out that the traditional argument from analogy suffers from several vulnerabilities. First, according to Hume, the argument fails because it assumes too complete a resemblance between two different sets of objects. Indeed, the analogical argument is based on the thought that the more properties two objects are known to share, the more likely it is that they also share other properties. Hume points out, however, that this line of thinking only carries so far: "That a stone will fall, that fire will burn, that the earth has solidity, we have observed a thousand and a thousand times; and when any new instance of this nature is presented, we draw without hesitation the accustomed inference. The exact similarity of the cases gives us a perfect assurance of a similar event; and a stronger evidence is never desired nor sought after. But where-ever you depart, in the least, from the similarity of the cases, you diminish proportionably the evidence; and may at last bring it to a very weak analogy, which is confessedly liable to error and uncertainty."[10]

Thus, the similarities between two different kinds of things, for example between human-made objects (such as a pocket watch) and natural objects (such as biological structures), are still always incomplete. Different things, as similar as they might seem at first glance – or even after closer inspection – may share many properties but never all of them. Consequently, it is impossible to know whether

8 Ibid., 229.

9 Ibid.

10 D. Hume, *Dialogues Concerning Natural Religion*, Penguin Books, London 1779, D 2.7, KS 144.

they share the property of "being designed." In other words, inferring a particular object as designed is more or less based on an individual observer's subjective intuition, rather than objective evidence.

Second, the analogical argument cannot show that the designer would be some particular being, for instance, the God of Christianity, as has often been assumed in the Western tradition. In fact, Hume claims that the argument does not even offer grounds for assuming that there would exist just one designer.[11] Logically, there are no grounds for ruling out the possibility of multiple designers.[12] "And what shadow of an argument… can you produce, from your hypothesis, to prove the unity of the Deity? A great number of men join in building a house or ship, in rearing a city, in framing a commonwealth: why may not several deities combine in contriving and framing a world? This is only so much greater similarity to human affairs. By sharing the work among several, we may so much farther limit the attributes of each, and get rid of that extensive power and knowledge, which must be supposed in one deity, and which, according to you, can only serve to weaken the proof of his existence."[13]

Third, the argument from analogy also calls the assumptions about the perfectness and infinity of the designer into question, making it even more difficult to associate the designer with the Christian God: "This world, for aught he knows, is very faulty and imperfect, compared to a superior standard; and was only the first rude essay of some infant deity, who afterwards abandoned it, ashamed of his lame performance: it is the work only of some dependent, inferior deity; and is the object of derision to his superiors: it is the production of old age and dotage in some superannuated deity; and ever since his

11 Ibid., Pt. V.

12 Similarly, Immanuel Kant argued that the design argument can at most prove the existence of some kind of architect, not the God of Christianity or a similar "all-sufficient original being" (I. Kant, *The Critique of Pure Reason*, trans. from German and eds. P. Guyer, A.W. Wood, Cambridge University Press, Cambridge 1988).

13 D. Hume. *Dialogues Concerning Natural Religion*, op. cit., D 5.8, KS 167-8.

death, has run on at adventures, from the first impulse and active force, which it received from him."[14]

4. THE PERSISTENCE OF THE DESIGN INTUITION AND THE NEED FOR EVIDENCE

Despite philosophical criticism, until the competing evolutionary explanation was introduced by Charles Darwin[15] and Alfred Russel Wallace[16] in the mid-nineteenth century, the design argument was widely endorsed. Both philosophers and scientists were convinced that the most reasonable explanation for the perceived adaptedness of organisms was that they had been purposefully designed by God.[17] Although evolutionary biology has since shown that the complexity of life forms can be explained by the gradual development of organisms, the intuitive attractiveness of a design has not disappeared. Even as prominent an atheist as Richard Dawkins admits that many features of the natural world look as if they have been designed. According to him, "[b]iology is the study of complicated things that give the appearance of having been designed for a purpose."[18] However, Dawkins hastens to add that there is a clear distinction between complicated biological objects, which appear to be designed,

14 Ibid., D 5.12, KS 168-9.

15 C. Darwin, *On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life*, John Murray, London 1859.

16 A.R. Wallace, *On the Tendency of Varieties to Depart Indefinitely From the Original Type*, in: *Alfred Russel Wallace Classic Writings, Paper 1*, ed. C.H. Smith, Western Kentucky University 2009.

17 E. Sober, *Philosophy of Biology*, Westview, Boulder 1993, 29. For a thorough presentation of the historical development and contemporary perspectives on the relationship between the design argument and the theory of evolution, see A.E. McGrath, *Darwinism and the Divine – Evolutionary Thought and Natural Theology*, Wiley-Blackwell, Oxford 2011.

18 R. Dawkins, *The Blind Watchmaker – Why the Evidence of Evolution Reveals a Universe without Design (Illustrated Edition)*, W.W. Norton, New York 2015, 4.

and man-made artefacts, which "are complicated and obviously designed for a purpose."[19]

It is true that the appearance of a design does not necessarily coincide with an actual design. In other words, the mere intuition that some particular object – as complex as it may appear to be – is designed does not mean that it really is. Further evidence that reaches beyond intuition is needed. It has been argued that humans might have developed a tendency towards intuitively favouring teleological explanations as the cause of ambiguous phenomena because it would have given us a survival advantage in avoiding predators.[20] Justin Barret explains that our "agent detection device suffers from hyperactivity, making it prone to find agents around us, including supernatural ones, given fairly modest evidence of their presence".[21] However, the existence of a hyperactive agent detection device in itself neither proves nor disproves the existence of supernatural agents.[22] To repeat, we need further evidence.

During the last twenty years, a new movement promoting the idea that it might be possible to gain reliable empirical evidence of a design in nature has emerged: Intelligent Design (ID). ID can be defined as follows: "Intelligent design (ID) is a scientific theory that employs the methods commonly used by other historical sciences to conclude that certain features of the universe and of living things

19 Ibid., 4.

20 J. Barrett, *Exploring the Natural Foundations of Religion*, Trends in Cognitive Sciences 4(2000)1, 29-34.

21 Ibid., *Why Would Anyone Believe in God?*, AltaMira, Walnut Creek 2004, 31.

22 D. Leech, A. Visala, *The Cognitive Science of Religion – A Modified Theist Response*, Religious Studies 47(2011)3, 301-316; Ibid., *The Cognitive Science of Religion – Implications for Theism?*, Zygon: Journal of Religion and Science 46(2011)1, 47-64; A. Visala, *Naturalism, Theism and the Cognitive Study of Religion – Religion Explained? (Ashgate Science and Religion Series)*, Ashgate, Farnham 2011.

are best explained by an intelligent cause, not an undirected process such as natural selection."[23]

According to one of its major proponents, William A. Dembski, whose formulation of the design argument I consider in this paper, ID "is linked both conceptually and historically" to British natural theology, which he describes as "the attempt… to understand divine action scientifically."[24] Although sometimes regarded as outdated, for Dembski natural theology contains a seed of truth which could be developed further: "British natural theology died in the nineteenth century. A positivist conception of science that restricted science to the study of undirected natural causes effectively did away with it. That faulty conception of science is still with us. … Although natural theology was not without its problems, it contained a core idea-design-which neither positivism nor Darwinism ever adequately addressed. … [T]he blanket dismissal of natural theology in the nineteenth century was not warranted and… its core idea of design remains viable."[25]

5. INTELLIGENT DESIGN AND THE NEW DESIGN ARGUMENT

The strategy Dembski and his fellow advocates of ID employ in formulating the design argument is substantially different from that of the natural theologians in the preceding centuries. Whereas Paley and his contemporaries mostly relied on analogical arguments, the new versions of the argument draw on logic and probability. In this paper the focus is on Dembski's variant, which can be regarded as the most rigorous formulation of the design argument among ID

23 The Center for Science and Culture, *What Is the Science Behind Intelligent Design?*, 2009 (https://www.discovery.org/a/9761/), [accessed 09/2020].

24 W.A. Dembski, *Intelligent Design – The Bridge Between Science and Theology*, InterVarsity, Downers Grove 1999, 16.

25 Ibid., 16.

proponents.[26] The argument is eliminative: a design is inferred if competing explanations can be ruled out with a high probability. Dembski holds that there are three possible modes of explanation of any event occurring in the universe: regularity, chance, and design.[27] These three explanatory modes are mutually exclusive and exhaustive, in other words, one and only one of them is the cause of any particular event.[28]

According to ID, in biology the argument can be used to show that there are some biological structures that would not have developed through undirected natural causes, contrary to what is assumed in the theory of evolution. Dembski stresses that although a design can be detected in any kind of phenomena (abstract or material, real of theoretical), cases of a design observed in the biological world are particularly significant. Supporters of ID claim that it can be empirically shown that some biological structures are too complex to have emerged through chance and regularity alone, that is, through natural causes. Consequently, because the only option for natural causes is a supernatural design, it is possible to argue for the existence of God (or some other supernatural being) convincingly.

Supposedly, the probabilistic design argument might be able to escape much of Hume's criticism against Paley's argument, although the basic idea of inferring the existence of God from features of nature is similar. This is because the new version of the argument

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26 Ibid., *The Design Inference – Eliminating Chance through Small Possibilities (Cambridge Studies in Probability, Induction, and Decision Theory)*, Cambridge University Press, Cambridge 1998; Ibid., *Intelligent Design – The Bridge Between Science and Theology*, op. cit.; Ibid., *No Free Lunch – Why Specified Complexity Cannot Be Purchased without Intelligence*, Rowman and Littlefield, Plymouth 2002. For other versions of the argument, see, e.g.: M.J. Behe, *The Edge of Evolution – The Search for the Limits of Darwinism*, Free Press, New York 2007; S.C. Meyer, *Signature in the Cell – DNA and the Evidence for Intelligent Design*, Harper One, New York 2009.

27 In his later writings, Dembski uses "necessity" instead of "regularity".

28 W.A. Dembski, *The Design Inference – Eliminating Chance through Small Possibilities*, op. cit., 36-39.

does not rely solely on intuition, that is, an object does not count as designed simply because it intuitively appears to have a design. Instead, ID tests the design intuition with formal calculations to find out whether it actually is more probable that the emergence of the object is due to a design than to other causes. Dembski holds that the progress of science has now led to the point where we can reliably say what natural causes are and are not capable of producing: "It is the empirical detectability of intelligent causes that renders intelligent design a fully scientific theory and distinguishes it from the design arguments of philosophers or what has traditionally been called ‚natural theology.' … Precisely because of what we know about undirected natural causes and their limitations, science is now in a position to demonstrate design rigorously. In the past design was a plausible but underdeveloped philosophical intuition. Now it is a robust program of scientific research."[29]

6. DETECTING DESIGN THROUGH SPECIFIED COMPLEXITY

Dembski claims that it is possible to determine whether an object is caused by chance, regularity, or design by examining, first, the probability of the object coming into existence and, second, whether the object is "specified" or not.[30] According to him, after observing some interesting event, it should first be evaluated whether the probability of the event occurring is high, that is, one.[31] If this is the case, the event is attributed to regularity. If the probability is not high, it is next evaluated whether the probability is intermediate (higher than 10^{-150}).[32] If the event is of intermediate probability, it is attributed

29 Ibid., *Intelligent Design – The Bridge Between Science and Theology*, op. cit., 107.

30 Ibid., *The Design Inference – Eliminating Chance through Small Possibilities*, op. cit., 36-49.

31 Dembski uses the terms "object" and "event" somewhat interchangeably. In his theory, an event occurring and an object coming into existence are essentially the same thing.

32 See below for details.

to chance. Only with probabilities lower than this, the possibility of design needs to be considered: "Regularities are always the first line of defense. If we can explain by means of regularity, chance and design are automatically precluded. Similarly, chance is always the second line of defense. If we can't explain by means of a regularity, but can explain by means of chance, then design is automatically precluded. … [E]xplanations that appeal to regularity are indeed simplest, for they admit no contingency, claiming things always happen that way. Explanations that appeal to chance add a level of complication, for they admit contingency, but one characterized by probability. Most complicated are those explanations that appeal to design, for they admit contingency, but not one characterized by probability."[33]

If the probability of the event turns out to be small (lower than 10^{-150}), the event is – in the ID terminology – "complex" and the possibility of a design should be examined. The important thing now is to find out whether the event is "specified" or not. If the event is specified, it features a specified complexity and is designed; if not, it is caused by chance. A specified event, for Dembski, is an event that conforms to a pattern that can be constructed independently of the event, although not necessarily before the event has occurred.[34] In other words, if an event is both highly improbable (complex) and definable through a separate pattern without reference to the actual event (specified), it can be inferred as designed.

As for probabilities, Dembski calls the probability of 10^{-150} the universal probability bound. This bound is based on three facts: the number of elementary particles in the universe, the maximum rate at which transitions in physical states can occur, and the age of the universe. Dembski deduces that because every specified event requires at least one elementary particle to specify it, and because

33 W.A. Dembski, *The Design Inference – Eliminating Chance through Small Possibilities*, op. cit., 38-39.

34 Ibid., 136.

such specifications cannot be generated faster than Planck time, the number of specified events through the history of the universe must fall below 10^{-150}. Thus, Dembski deduces that every specified event whose probability is less than the universal probability bound is highly improbable to have come about by natural causes.[35]

7. FROM DESIGN TO A DESIGNER

To repeat, according to the advocates of ID by using the criterion of specified complexity it is possible to discern between designed and non-designed things in a much more reliable manner than through the traditional design argument. Furthermore, they hold that a design can be – and has in fact been – detected also in the biological world. As Dembski emphasises, "the focus of the intelligent design movement is in biology. That's where the action is."[36] Clearly, if signs of a design were probably discovered in nature, the consequences would be significant. The existence of a supernatural intelligent designer who has designed the objects portraying a specified complexity would be proven with a very high probability. In this sense, this new and more rigorous design argument is, if successful (for now, let us assume that it is), much more effective than the traditional one and a big leap forward in the history of the arguments for the existence of a supernatural being.

In practice, this would mean that naturalistic theories would lose much – if not all – of their credibility in philosophy. At the same time, if the existence of a supernatural being were confirmed, it would obviously open up plenty of chances to develop theistic (or other religious-based) theories of philosophy in a much more solid

35 Ibid., *The Design Revolution – Answering the Toughest Questions about Intelligent Design*, InterVarsity, Downers Grove 2004, 84-85. For a more thorough treatment, see ibid., *Specification – The Pattern That Signifies Intelligence*, Philosophia Christi 7(2005)2, 299-343.

36 Ibid., *Intelligent Design – The Bridge Between Science and Theology*, op. cit., 14.

manner than is currently possible. In my view, this is exactly the aim of the advocates of an intelligent design – to make explanations appealing to the supernatural acceptable and question the plausibility of naturalistic philosophy.

However, there are limits to the ID's design argument. At best, it is an argument for the existence of some kind of supernatural being. The identity of the supernatural designer would remain a mystery, since the ID theory itself does not have the means to reveal the identity of the designer. Dembski himself admits that: "[T]he designer is compatible with the Creator-God of the world's major monotheistic religions like Judaism, Christianity and Islam. But the designer is compatible with the watchmaker-God of the deists, the demiurge of Plato's Timaeus and the divine reason (i.e., *logos spermatikos*) of the Ancient stoics. One can even take an agnostic view about the designer, treating specified complexity as a brute unexplainable fact."

Indeed, when discussing the identity of the supernatural designer in the context of ID, it should be kept in mind that the term "supernatural" is understood to refer to any intelligent agent powerful enough to manipulate the development of biological organisms. It is precisely in this regard that the designer would be "above nature", that is, supernatural. Dembski himself thinks that "such an intelligence would in all likelihood be unembodied", but he is also quick to admit that "strictly speaking this is not required of intelligent design – the designer could in principle be an embodied intelligence, as with the panspermia theories."[37]

Nevertheless, it must be noted that most of the advocates of ID think that the supernatural designer is the Christian God. This becomes clear in their more popular writings. Dembski, for

37 Ibid., *No Free Lunch – Why Specified Complexity Cannot Be Purchased without Intelligence*, op. cit., 333.

example, makes it clear that he believes the designer to be the God of Christianity.[38]

In this sense, the ID's design argument is more agnostic than the classical analogical argument. Whereas William Paley and his fellow Englishmen rather straightforwardly identified the designer as the God of Christianity, advocates of the ID theory stress that such a conclusion cannot be drawn merely on the grounds of the theory. The designer is just some designer. In other words, Hume's criticism regarding the identity of the designer is addressed by dodging the question. On the other hand, from the perspective of Christian apologetics this rather straightforwardly means that Hume's criticism of multiple, infant, or superannuated designers cannot be escaped.

However, it is not clear that even Christians should straightforwardly identify the designer as the Christian God. In fact, it seems that the ID's designer lacks several properties traditionally associated with God, for instance properties concerning omnipotence and transcendence, as I have argued elsewhere.[39]

8. PROBLEMS WITH THE ID'S DESIGN ARGUMENT

The ID's design argument also faces other, and more serious, challenges, especially when applied to biology.[40] By far the most used

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38 D. Williams, *Friday Five: William A. Dembski*, CitizenLink, December 14 2007; W.A. Dembski, *Intelligent Design – The Bridge Between Science and Theology*, op. cit., 210.

39 J. Loikkanen, *William A. Dembski's Project of Intelligent Design*, Studia Theologica – Nordic Journal of Theology 72(2018)1, 68-83.

40 I only offer a very short overview of the critique ID has attracted here. For a more detailed analysis, see, e.g.: B. Fitelson, C. Stephens, E. Sober, *How Not to Detect Design – Critical Notice: William A. Dembski, 'The Design Inference'*, Philosophy of Science 66(1999)3, 472--488; H.J. Van Till, *'Intelligent Design' Theory, Two Viewpoints – Does 'Intelligent Design' Have a Chance?*, Zygon: Journal of Religion and Science 34(1999)4, 667-675; M. Perakh, *Unintelligent Design*, Prometheus, Amherst 2003; *Why Intelligent Design Fails – A Scientific Critique of the New Creationism*, ed. M. Young, T. Edis, Rutgers University Press, New Brunswick 2004; G. Dawes, *What is Wrong with Intelligent Design?*, International

example of a biological organism that is allegedly designed (and actually the only one that, for example, Dembski honestly seems to support) is the flagellum of the *Escherichia coli* bacterium.[41] Surely, one plausible counterexample is sufficient to disprove the claim that all biological organisms have been produced by natural causes. In other words, if it could be confirmed that the bacterial flagellum exhibits specified complexity – and if it is assumed that the criterion of specified complexity is a reliable method of detecting design in the first place – it must be accepted that supernatural causes have played a part in the development of some biological structures (the flagellum, in particular).

Focusing on this one example does not mean that Dembski thinks there are no other biological objects that are designed. When Dembski suggests that the promoters of intelligent design do not need to be "committed to every biological structure being designed"[42] but merely to "find some clear instances of design and nail them down,"[43] this does not appear to fully reflect his personal views. Instead, it seems a strategic choice to only highlight "some clear instances of design." In order to make a case against naturalism, it is not necessary to show that design exists everywhere in the world (although Dembski

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Journal for Philosophy of Religion 61(2007)2, 69-81; D. Bartholomew, *God, Chance and Purpose – Can God Have It Both Ways?*, Cambridge University Press, Cambridge 2008; M. Boudry, S. Blancke, J. Braeckman, *Irreducible Incoherence and Intelligent Design – A Look into the Conceptual Toolbox of a Pseudoscience*, The Quarterly Review of Biology 85(2010)4, 473-482; M.J. Murray, *Natural Providence (Or Design Trouble)*, in: *Philosophy of Religion – An Anthology*, ed. L.P. Pojman, M.R. Rea, Wadsworth, Belmont 2012, 596-612; J. Loikkanen, *William A. Dembski's Argument for Detecting Design through Specified Complexity*, Philosophy and Theology 27(2015)2, 289-306. See also note 47.

41 W.A. Dembski, *No Free Lunch – Why Specified Complexity Cannot Be Purchased without Intelligence*, op. cit., 267-302.

42 Ibid., *The Design Revolution – Answering the Toughest Questions about Intelligent Design*, op. cit., 63.

43 Ibid., *The Logical Underpinnings of Intelligent Design*, in: *Debating Design – From Darwin to DNA*, ed. W.A. Dembski, M. Ruse, Cambridge University Press, Cambridge 2004, 311--330, 210.

might believe that it does[44]). It is enough to highlight one credible example of design.

Dembski sees the flagellum expressing specified complexity and, thus, design. However, following his fellow ID advocate Michael Behe's idea of "irreducible complexity",[45] he calculates the probability of the formation of the bacterial flagellum through a random assembly of proteins.[46] The theory of evolution, however, suggests that proteins are not drawn together randomly, but evolve in interaction with other molecules from simple forms and gradually form more and more complex structures.[47] It has been shown that in the case of the bacterial flagellum, there are also plausible scenarios for the structure having evolved gradually without a non-functional intermediate,

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44 Dembski believes that "God created nature as well as any laws by which nature operates. Not only has God has created the world, but God upholds the world moment by moment." (W.A. Dembski, *Reinstating Design within Science*, in: *Unapologetic Apologetics – Meeting the Challenges of Theological Studies*, ed. W.A. Dembski, J.W. Richards, InterVarsity, Downers Grove 2001, 239-257, 222.)

45 An irreducibly complex system, according to Behe's definition (1996, 39), is "a single system composed of several well-matched, interacting parts that contribute to the basic function, wherein the removal of any one of the parts causes the system to effectively cease functioning." Because the irreducible core of an irreducibly complex system can't be simplified without destroying the basic function, Dembski argues that there can be no evolutionary precursors with simpler cores that perform the same function. It follows that the only way for a direct Darwinian pathway to evolve an irreducibly complex system is to evolve it all at once and thus by some vastly improbable or fortuitous event. In other words, Dembski holds that irreducibly complex systems are necessarily formed in one go because the probability that any putative precursors of an irreducibly complex system could have evolved into a system through evolutionary means is extremely small. W.A. Dembski, *Irreducible Complexity Revisited*, Progress in Complexity, Information, and Design (2004)3.1.4, 1-47.

46 For exact calculations, see Ibid., *No Free Lunch – Why Specified Complexity Cannot Be Purchased without Intelligence*, op. cit., 289-302.

47 B. Alberts, A. Johnson, J. Lewis, D. Morgan, M. Raff, K. Roberts, P. Walter, *Molecular Biology of the Cell (Sixth Edition)*, Garland Science – Taylor and Francis, New York 2015, 109-172.

with selective benefits at each step.[48] Therefore, it is reasonable to assume that the ordinary evolutionary mechanisms apply in the case of the flagellum.

The ID's design argument suffers from vulnerabilities at a more abstract level as well. The two main problems here concern the universal probability bound and specifications. The universal probability bound was based on the maximum number of possible interactions of elementary particles occurred during the history of the observable universe. However, the probability of an individual event only depends on the characteristics of the phenomenon under investigation, not on the number of all possible events in the universe. Even though there were only 10^{150} possible events, some of these events could have a probability lower than 10^{-150}, and some of them higher than that. There is a difference to be made between counting the number of possible states and assigning a probability distribution over those states. In most real-life cases, using a uniform probability distribution does not make sense.[49]

A specified event was defined as an event that conforms to a pattern that can be determined independently of the event. However, human observers with limited background information may not be able to discern reliably between specified and non-specified events. Their abilities are always conditioned by their knowledge of the event in question. In many real-life situations, where complex patterns cannot be defined with mathematical precision, drawing a clear line between a specification and a non-specification is extremely difficult, unless it has been decided in advance which patterns count

48 M.J. Pallen, N.J. Matzke, *From the Origin of Species to the Origin of Bacterial Flagella*, Nature Reviews Microbiology 4(2006)10, 784-790; T. Wong, A. Amidi, A. Dodds, S. Siddiqi, J. Wang, T. Yep, D.G. Tamang, M.H. Saier Jr., *Evolution of the Bacterial Flagellum*, Microbe 2(2007)7, 335-340; B. Chaban, I. Coleman, M. Beeby, *Evolution of Higher Torque in Campylobacter-type Bacterial Flagellar Motors*, Scientific Reports 8(2018)1, article 97.

49 B. Fitelson, C. Stephens, E. Sober, *How Not to Detect Design – Critical Notice: William A. Dembski, 'The Design Inference'*, op. cit., 485-486.

as specifications and which do not – and this would be tautological. Hence, there seems to be no way to escape subjectivity and control it adequately.[50]

9. CONCLUSION

In its subjectivity relating to specifications, the contemporary version of the design argument comes surprisingly close to the classical one, which was more or less based on an individual observer's intuition whether a particular object show signs of a design. The new argument only frames this in a more technical manner. Of course, subjective impressions are, to varying degrees, present in all human cognitive endeavours.[51] A particular method of detecting design does not have to be completely infallible in order to be useful. However, the ID argument, which is based on a clear distinction between design and non-design and between specified and non-specified objects, precision is called for.[52] It seems that Dembski and his colleagues have not quite managed to reach the level of rigor they have aimed for.

To extend the analysis to a more general level, it could be argued that real-life events and objects are usually inferred as designed without constructing exact patterns to match them or assigning exact probabilities to their occurrence. Instead, it might be that some phenomena simply correlate with the minds of human observers in a way that convinces them of the presence of a design. Del Ratzsch explains this as follows: "Under certain circumstances, something clicks into place between the shape of our cognition and the focus

50 D. Bartholomew, *God, Chance and Purpose – Can God Have It Both Ways?*, op. cit., 97--115; M.J. Murray, *Natural Providence (Or Design Trouble)*, op. cit., 600.

51 D.H. Mulder, *Objectivity*, in: *Internet Encyclopedia of Philosophy*, ed. J. Fieser, B. Dowden, 2004, (https://iep.utm.edu/objectiv/), [accessed 09/2020].

52 Dembski formulates his theory with the assumption that the pattern "precisely identifies" the event. W.A. Dembski, *Specification – The Pattern That Signifies Intelligence*, op. cit., 16.

of our experience. Something fits." An observer's mind recognises a "counterflow," that is, "things running contrary to what, in the relevant sense, would (or might) have resulted or occurred had nature operated freely."[53] This perception of a counterflow can be based, for instance, on "complex structures, coordination of components, adjustment of means to end, interlocking functions, extreme improbability, purposelike behaviors."[54] This is not very far from the original, more intuitive design argument introduced by Paley and his contemporaries.

To conclude, in my view the big difference between the traditional design argument and the new one is that, if specified complexity was a reliable method to detect design, if the method could be applied to natural phenomena, and if some of these phenomena exhibited specified complexity, then it would be proven with a very high probability that a supernatural designer exists. Inferring objects as designed would not be based on mere intuition anymore. The proponents of ID, and William Dembski in particular, deserve acknowledgement for their attempt to construct an elaborate method for detecting design. Unfortunately, in its current form the argument does not contribute very much to the discussion.

Nevertheless, philosophically speaking the basic question raised by ID is worthy of consideration: "Is nature complete in the sense of possessing all the resources needed to bring about the information-rich biological structures we see around us, or does nature also require some contribution of design to bring about those structures?"[55] This question has intrigued philosophers and theologians, as well as common people, for centuries and it continues to do so today. The final answer to it remains to be determined.

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53 D. Ratzsch, *Nature, Design, and Science –The Status of Design in Natural Science*, State University of New York Press, Albany 2011, 14.

54 Ibid., 12.

55 W.A. Dembski, *The Design Revolution – Answering the Toughest Questions about Intelligent Design*, op. cit., 132-133.

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DESTRUCTIVE ACTIVITY IN AN ECOLOGICAL ETHICS OF CO-CREATION

Abstract. A Christian worldview entreats humans to live in ethical relationship with the natural world; our current ecological crisis makes that call of crucial and immediate importance. If humans, and Christians in particular, are to adequately participate in care for creation, then we must proceed with both ecological and theological knowledge about the natural world. In both scientific and theological analyses, we uncover not only creative processes of growth, but elements of chaos and destruction. The carbon cycle, food webs, and evolution are examples of where the earth's survival depends upon destructive processes. In parallel fashion, God's activity in Scripture also entails chaos and destructive activity, such as the flood in Genesis, the wisdom of the Book of Job, and Paul's reflection on creation in Romans. This article argues that humans, called to be co-creators with God, thus need to integrate destructive activity into our framework of what it means to "co-create," thereby participation in creation in a more holistic manner. Far from unleashing unrestricted destruction on the world, such a framework offers ethical guidelines for destroying and creating in ways that support the overall flourishing of the natural world.

Keywords: ecological ethics; co-creator; destruction; ecology; Catholic social teaching; Philip Hefner

1. INTRODUCTION

We humans are constantly reminded – in the form of hurricanes, floods, tsunamis, fires, harm from non-human animals, and even viruses – that we are, in many ways, at odds with other parts of the environment. Some of these events, especially hurricanes, floods,

and droughts, are a result of anthropogenic climate change,[1] but other occurrences of natural destruction are built into the system, so to speak. Ecological processes such as the carbon cycle, food webs, and evolution depend upon decay, destruction, and death in order to function.

In reading Genesis 1, Catherine Keller asserts that "the *tehom* – the deep, the sea, or the chaos – long ago fell victim to an in-house tradition of demonizing it as evil disobedience."[2] The unpredictability of the sea, and more broadly of nature, causes what Keller refers to as "tehomophobia," or a fear of the chaos that is described in Genesis and has always been present in the world.[3] In positing environmental chaos as an evil to be feared and overcome by order, humanity loses sight of the role that chaos and destruction play in the bigger scheme of the earth's processes. Moreover, as Keller poignantly states, "if the seas had been primordially identified as a churning waste, a watery wilderness, we have correspondingly treated them as the ultimate sewer."[4] This might be extrapolated to the rest of the environment: if there are parts of the environment that are dangerous and chaotic, and thus evil, then humanity is free to treat them as waste.

This means that if certain ecological processes or features are regarded as disposable, this puts the integrity of the whole environment at risk. But if humans are envisioned as "co-creators," called to work for the benefit of creation in cooperation with the Creator, then understanding and working within the realities of natural decay and

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1 H. Riebeek, *The Rising Cost of Natural Hazards*, The Earth Observatory, March 28, 2005, (http://earthobservatory.nasa.gov/Features/RisingCost/rising_cost.php), [accessed 08/2020].

2 C. Keller, *No More Sea: The Lost Chaos of the Eschaton*, in: *Christianity and Ecology: Seeking the Well-Being of Earth and Humans*, ed. D.T. Hessel, R. Radford Ruether, Harvard University Press, Cambridge 2000, 183.

3 Ibid., 184.

4 Ibid., 185.

destruction are vital to participating in creation.[5] Rather than waging a battle against the chaos, I argue that engaging themes of destruction in Scripture (with some healthy nuance) can reframe an ecological ethic so that certain types of destruction become incorporated into the processes that drive toward creative and sustainable ends. I do not mean to imply that what occurs in nature is identical with ethical imperatives (i.e., it does not involve an "is-ought" paradigm), but that an ecological ethic must engage with ecological science to draw proper conclusions about ethical ecological relationships, and often, destruction and chaos are a major part of ecology.

A note about terms: in line with Keller, I understand chaos as "nonlinear patterns of unpredictable, asymmetrical dynamics in nature, such as the turbulence of winds and waters, tides, clouds and flames, as well as ecological and economic shifts."[6] This is not identical with destruction, and can even sometimes be a site of creative activity, but chaos includes an element of destruction often enough. Likewise, destruction refers to some force or process that involves death, decay, or harm; it is not always objectively chaotic, though even destruction that occurs within orderly processes might be experienced as chaotic by those affected. As such, I use these terms separately with these distinctions in mind. However, I also argue that there is enough overlap between them, especially when taking human experience of the world into account, that it is helpful to think of them as similar or parallel categories when talking about the theological implications of natural processes.

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5 The encyclical letter *Laborem Exercens* asserts that "*man,* created in the image of God, *shares by his work in the activity of the Creator*", but stops short of naming persons as "co-creators." *Laudato Si'* takes a similar approach. John Paul II, *Laborem Exercens*, Vatican City State 1981; Francis, *Laudato Si'*, Vatican City State 2015.

6 C. Keller, *No More Sea*, op. cit., 193.

2. NATURALLY-OCCURRING AND ANTHROPOGENIC DECAY AND DEGRADATION

Heeding Willis Jenkins's admonition to begin ecological ethics by evaluating the concrete problems of the present situation, this section turns to a scientific analysis of ecological processes which require death and/or decay for proper functioning and an examination of the degradation which has caused the current ecological crisis.[7] These types of processes can be found on ecological, biological, and physiological levels; here, I will explore the examples of the carbon cycle, food webs, and evolution. Each of these processes necessarily entails destruction, but they have also been thrown out of balance by an excess of human-caused, or anthropogenic, environmental degradation.

2.1. THE CARBON CYCLE

Carbon is crucial for the maintenance of all forms of life, from humans and other animals to plants, and stabilizes climate. On some planets, carbon dioxide makes up a significant portion of the atmosphere; on Earth, it is found in the atmosphere in only trace amounts, as the atmosphere acts as a kind of centralized "pit stop" for carbon as it is traded between rocks, water, plants, soil, and fossil fuels.[8] Matter which absorbs and stores carbon is called a "sink," whereas matter that releases "carbon" is referred to as a "source," though some regions, such as old growth forests, both absorb and release carbon and are therefore neutral.[9]

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7 W. Jenkins, *The Future of Ethics: Sustainability, Social Justice, and Religious Creativity*, Georgetown University Press, Washington 2013, 4.

8 D. Archer, *The Global Carbon Cycle*, (Series: Princeton Primers in Climate), Princeton University Press, Princeton 2010, 5-6.

9 Ibid., 106.

The global carbon cycle operates on a few planes. One, referred to as the "stable geologic carbon cycle," is based on the chemical dissolution of rocks and carbon dioxide released through volcanic activity and deep-sea vents. This stable geologic cycle operates on a timeline of at least a hundred million years, sometimes longer, and accounts for long-term climate regulation.[10] Carbon also cycles through ice sheets in a much more irregular manner, where pockets of atmosphere are stored in the ice and then released when the ice breaks down or melts. The timeline for the unstable glacial cycle is shorter than the geologic cycle (still several million years) but erratic.[11] Perturbation in the glacial cycle creates a positive feedback loop, which can have strong effects on climate.[12]

The carbon cycle that occurs within the biosphere, mainly located in forest systems, is fastest and therefore perhaps most relevant for stabilizing carbon levels within our lifetimes.[13] Carbon cycles between "pools" of matter within the ecosystem, moving from living biomass to deadwood and soils as living plant life respirates, dies, and decomposes.[14] These cycles occur on a variety of timelines, but on the whole, carbon cycles through the biosphere much more quickly than it does through the atmosphere, oceans, and geologic matter.[15]

Within the entirety of the global carbon cycle, but especially within the biosphere, the life of some organisms depends upon the death and breakdown of others. Though the carbon itself might be seen as undergoing a process of transformation into various forms, the cycle depends upon the destruction of individual organisms to

10 Ibid., 10.
11 Ibid., 12-13.
12 Ibid., 13.
13 K. Hoover, A.A. Riddle, *Forest Carbon Primer (CRS Report)*, in: *Congressional Research Service*, May 5, 2020, 2 (https://crsreports.congress.gov/product/pdf/R/R46312/6), [accessed 08/2020].
14 Ibid., 2-4.
15 D. Archer, *Global Carbon Cycle*, op. cit., 50-51.

facilitate a climate stable enough for the forms of life that are found on Earth.[16] The decay of organic matter also provides the carbon that is necessary for living matter to produce energy, grow, and one day die and produce the necessary element for other life forms in turn.

The manner in which the global carbon cycle operates creates an overall balance in the Earth's ecosystems. The excessive burning of fossil fuels and deforestation caused by humans, on the other hand, throws off that balance by releasing more carbon into the atmosphere than can be absorbed by sinks. Existing sinks, moreover, are increasingly overwhelmed as forests are cleared. Without means to absorb it, carbon dioxide remains in the atmosphere, acting as a greenhouse gas and causing climate change and levels of destruction that would not otherwise occur.[17] The weathering system of the Earth, which keeps the climate stable, will take hundreds of thousands of years to adjust for anthropogenic climate change.[18] In addition to direct CO2 pathways between human activity and the physical climate system, anthropogenic change also causes feedback loops. For instance, increased temperature causes higher soil respiration, which

16 One might see this entire cycle as purely transformation, but that perspective depends upon a collective understanding of organisms and elements that sees them as part of a whole, rather than as individual organisms or elements. While both perspectives contain insight, I argue that if ecological spiritualities, such as those offered by *Laudato Si'* and Elizabeth Johnson in *Ask the Beasts*, challenge us to see non-human elements of the environment as having value in their own right, which includes understanding them as organisms and elements in and of themselves as well as part of their ecological systems. Proceeding from that perspective, even a non-living element of the environment, like a rock, is destroyed by natural carbon processes insofar as if a rock is dissolved into water, it ceases to be a rock. Likewise, if a plant is eaten by a deer, that plant is destroyed by being eaten. Of course, this idea becomes even more obvious in the following examples, in which systems depend upon the deaths of individual animals. See in particular *Laudato Si'*, chapter 6; E. Johnson, *The Community of Creation*, in: *Ask the Beasts: Darwin and the God of Love*, Bloomsbury, London 2014, 260-286.

17 D. Archer, *The Global Carbon Cycle*, op. cit., 16, 107-109, 142.

18 Ibid., 4.

releases even more carbon into the atmosphere.[19] Human responses to changing climates also impact the entire system, for better or for worse.[20] Humans – and human societies – are thus intimately involved in a network of carbon relationships in which they can cause change, decay, and destruction not only on a simple scale of cause-and-effect, but in an interlinked system where effects ripple and cascade in unpredictable ways. Unmitigated, the effects of anthropogenic change in the carbon cycle will be disastrously destructive.

2.2. FOOD WEBS

A food web is a system of interlocking food chains within an ecosystem.[21] Rather than tracing one line from predators down to fungi as in a chain, food webs reflect the reality that many consumers, producers, and decomposers interact in a more complicated system. This accounts for some of the danger talked about with a loss of biodiversity – the disappearance of one species can have deleterious effects on the stability of an entire ecosystem, not just a chain of three or four other species.[22]

Food webs and chains are divided into trophic levels, which are categorized according to the species' role in the web. The first trophic level is that of producers, or species that produce their own food (like plants), which are thus referred to as autotrophs. Generally, these include plants, algae, phytoplankton, and some types of bacteria.[23] At the second level are consumers, or those species which exist by

19 N. Gruber *et al.*, *The Vulnerability of the Carbon Cycle in the 21st Century: An Assessment of Carbon-Climate-Human Interactions*, in: *The Global Carbon Cycle: Integrating Humans, Climate, and the Natural World*, eds. Ch.B. Field, M.R. Raupach, Island Press, Washington 2004, 45.

20 Ibid., 45-46.

21 *Food chain/web*, in: *Environmental Encyclopedia*, ed. D.S. Blanchfield, Gale, Detroit 2015.

22 K.S. McCann, *Food Webs*, Princeton University Press, Princeton 2012, 18-19.

23 Food chain/web, op. cit.

eating other species. This level can be broken down into further levels of herbivores and carnivores, though data suggests that omnivory is pervasive throughout the predatory trophic levels.[24] The last trophic level is made up of decomposers, which subsist on non-living plant and animal matter (e.g., vultures), thereby "releasing nutrients back into the ecosystem."[25] As with the carbon cycle, the stability of food webs depends upon the death and decay of organisms in order to continue the lives of others.

Trophic levels are measured in terms of "biomass," which is a measure that reflects "the accumulated weight of all living matter."[26] In a healthy food web, biomass decreases as the trophic levels increase to create a pyramid-like structure, so that there are more autotrophs than primary consumers, more secondary than primary consumers, and so forth.[27] When biomass in one trophic level is altered (which often happens as a result of human activity), it creates what is referred to as a "cascade effect." For instance, deforestation and the corresponding spread in urban and suburban environments in the U.S. has impacted the population of top-level predators like gray wolves and mountain lions, which have wider ranging habitats than primary consumers and are thus more affected by deforestation.[28] These kinds of predators are also more likely to be felt as a threat to humans, and are thus hunted and expelled from environments that are inhabited by humans. Without being kept in check by wolves, deer populations explode and in turn result in an overconsumption of vegetation, which also affect leaf litter, arthropods, breeding birds, and soil nutrients.[29] Trophic cascades are also caused by the forces

24 Ibid.; K.S. McCann, *Food Webs*, op. cit., 119.
25 Food chain/web, op. cit.
26 Ibid.
27 K.S. McCann, *Food Webs*, op. cit., 76-77.
28 J.W. Bressette, H. Beck, V.B. Beauchamp, *Beyond the Browse Line: Complex Cascade Effects Mediated by White-Tailed Deer*, Oikos 121(2012), 1749.
29 Ibis., 1749.

of human globalization, which introduce invasive species into new ecosystems. In many cases, invasive species have no natural predators within foreign ecosystems, and thus overconsume and unbalance the system.

2.3. EVOLUTION

Made popular by Charles Darwin, evolutionary theory follows a logic of natural selection by which species' populations grow more fit for their environments over time, as the most well adapted are the ones who live longest and are thus most able to reproduce. This manifests as greater adaptive abilities for a species overall.[30] For instance, it has been observed that the beaks of finches on Galapagos Island grow sharper after a drought, enabling them to eat rougher seeds than they had previously been able to break open.[31] Evolutionary theory also includes the less frequently cited sexual selection, in which one gender of a species evolves in ways which are preferable to the opposite sex but have no apparent adaptive purpose.[32] Perhaps the most well-known example of this, first suggested by Darwin himself, is that of male lions' manes, which seem to serve no purpose except to attract female lions.[33] As interesting a process as the latter is, however, it is primarily the former which will be dealt with here.

It is not only death and decay which are present in the evolutionary process, but struggle

is as well – and not everyone survives the struggle. In fact, the process of evolution depends upon the fact that less adapted versions

30 See Chapter IV, in particular pages 151-154, of Ch. Darwin, *On the Origin of Species: By Means of Natural Selection*, (6th edition), Floating Press, Auckland 2009.

31 *Natural Selection at Work*, in: *Understanding Evolution*, 2016, (http://evolution.berkeley.edu/evolibrary/article/evo_26), [accessed 08/2020].

32 Ch. Darwin, *On the Origin of Species*, op. cit., 158.

33 Ibid., 159. For a more contemporary unpacking of this idea, see: P.M. West, C. Packer, *Sexual Selection, Temperature, and the Lion's Mane*, Science 297(2002), 1339-1343.

of the species are less able to survive, and thus die having had little chance to reproduce.[34] Moreover, sometimes the adaptive traits themselves entail struggle for some members of the species in order to benefit others. Elizabeth Johnson cites the example of the "backup" pelican chick: pelicans lay two eggs per season. One hatches several days before the other and is taken care of by its parent pelicans. If something happens to go wrong with the older chick within the time when it is the only one hatched, a second chick hatches and the adult pelicans still have one successful offspring for the season. However, if the older chick is healthy, it fights for the food supply and overcomes the younger, which either starves or gets kicked out of the nest by its older sibling. This process, which is horrible for the individual backup chick, is ultimately adaptive for the species by allowing each pair to almost always have a fruitful breeding season and add to the population. The evolutionary process which is generative for life also comes with strife.[35]

Hazardous anthropogenic change is not as closely related to evolutionary processes as it is to the carbon cycle and food webs; or, perhaps more accurately, the longitudinal nature of evolution does not allow us to study anthropogenic change as effectively. However, as Rachel Carson noted several decades ago, species adapt through evolution slowly over time, and humans have made conditions on Earth change very quickly.[36] It is already possible to observe changes that populations have made in response to pesticides, antibiotics, and environmental toxins.[37] It is then certainly not illogical to believe

34 Ch. Darwin, *On the Origin of Species*, op. cit., 146.

35 E.A. Johnson, *Ask the Beasts: Darwin and the God of Love*, Bloomsbury, London 2014, 185-186.

36 R. Carson, *Silent Spring*, Houghton Mifflin Company, Boston 1962, 6-7.

37 R. Dunn, *The Garden of Our Neglect: How Humans Shape the Evolution of Other Species*, Scientific American, July 5, 2012, (https://www.scientificamerican.com/article/how--humans-shape-evolution-other-species/), [accessed 08/2020].

that anthropogenic environmental changes will have unforeseeable effects on future evolutionary processes.

It is possible to conclude from this discussion that death, destruction, and decomposition are facets of naturally-occurring ecological and environmental processes, and are in fact vital to the healthy functioning of those processes and the maintenance of life on Earth. Anthropogenic environmental degradation, however, introduces precarity into ecological systems by destroying too much – too much fossil fuel, too many forests, too many predators, too many pests. The current rate of human destruction is more than the environment can handle and is caused by an exploitative relationship with the earth, rather than a perspective that holds the environment as valuable in itself. The current rate and kinds of destruction, along with the anthropocentric framework that supports it, is neither sustainable nor in alignment with the kinds of destruction on which ecological systems depend.

3. BIBLICAL DESTRUCTION IN CREATION

In much of the literature within Christian ecological ethics, Genesis chapters 1 and 2 are used as a framework for understanding the environment, since it is here where God acts as Creator.[38] While this is accurate and often helpful, it does not necessarily represent a holistic picture of who God is and how God acts within the Scriptures. Alongside the act of creation rests the uncomfortable fact that God also wreaks God's fair share of havoc in both the Hebrew Bible and the New Testament. The theme of God's destructive force is consistent across testaments, eras, authors, and genres. By looking at the themes of destruction in Scripture, we see that destruction is not just a natural occurrence or result of human irresponsibility, but is also a theological category.

38 Chapter 2 of *Laudato Si'* is one prominent example of this method.

The purpose here is not to formulate a theodicy or an apologetic for violence of any variety, including that of God. However, recovering the theme of destruction within the context of God's activity functions in two important ways: first, it serves as a reminder that the role of destruction properly belongs to God, as does the role of creator. As God speaks in Dt 32:39, "I kill and I make alive; I wound and I heal".[39] Second, it offers a framework in which naturally-occurring ecological destruction and chaos can be helpfully incorporated into an understanding of creation.

The imprecatory psalms – those psalms that call for God's destructive capacity – are perhaps the most notoriously difficult texts in Scripture. Fourteen psalms can be defined as such, and several more contain imprecatory verses.[40] These psalms implore God to enact justice on Israel's enemies using graphic language such as "the bloodthirsty and treacherous/shall not live out half their days" (Ps 55:23) and, perhaps most infamously, "Happy shall they be who take your little ones/and dash them against the rock!" (Ps 137:9). As will be true of many of the passages in this section, these are very difficult verses to reconcile with a loving and redeeming God. It is not necessary to sanitize the horror and violence contained therein. At the same time, however, it is helpful to read and understand such verses in the context of history and the whole of Scripture.

John N. Day places the imprecatory psalms within the context of the Torah.[41] God makes the Mosaic covenant with Israel and gives Israel the Law as a part of that covenant. The Torah is not simply an arbitrary set of rules for Israel to live by – it is revelatory of a just system and the promise of God to God's people. In Deuteronomy, God's promise is that of vengeance. This is not predicated upon divine

39 All biblical citates from: *The New Revised Standard Version of the Bible*, 1989, (https://www.biblegateway.com/versions/New-Revised-Standard-Version-NRSV-Bible).

40 J.N. Day, *The Imprecatory Psalms and Christian Ethics*, Bibliotheca Sacra 159(2002), 169.

41 Ibid., 168.

anger, per se, but upon the *lex talionis*, or the law of retaliation meant to ensure justice, found in Exodus 21, Leviticus 24, and Deuteronomy 19: "Anyone who maims another shall suffer the same injury in return: fracture for fracture, eye for eye, tooth for tooth; the injury inflicted is the injury to be suffered" (Lev 24:19-20). God gives Israel the Law as a covenant. Having suffered violence at the hands of its enemies, Israel holds God accountable to the Law in turn.[42] The imprecatory psalms do not represent a call for excessive violence (at least not in what the psalmist would have considered "excessive") so much as they represent Israel's trust in the justice of God's law. It is also of utmost importance that the role of vengeance is given to God rather than carried out by individuals or the community.[43]

Terence E. Fretheim also reads the narrative of the flood in Genesis within the framework of the just order of God's creation. He notes that the story begins with the assertion that "the earth was filled with violence" (Gn 6:11) because of the corruption of humanity, and that this corruption is the impetus for the destruction of the flood.[44] The flood is foremost a product of human sin, which disrupts the moral order of creation and affects the earth itself. God does not witness misbehavior and then decide which consequence to assign; consequences are instead built into the moral order, whose role is to ensure that "sin and evil [do] not go unchecked and so that God's good order of creation can be maintained and, if necessary, reestablished."[45] Rather than being imagined as doling out punishments externally to the moral order, God is portrayed as acting as judge insofar as God acts *within* the moral order that God has created.[46]

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42 Ibid., 174.

43 Ibid., 169.

44 T.E. Fretheim, *Creation Untamed: The Bible, God, and Natural Disasters*, Baker Academic, Grand Rapids 2010, 42.

45 Ibid., 49.

46 Ibid., 49.

This, then, is the first takeaway of the flood story: God's destructive actions work within the order of creation. Destructive consequences are built into creation itself, with God acting as their mediator.[47] A second point is this: unlike the *lex talionis*, God's judgement leaves room for God's mercy.[48] At the beginning of Genesis 6:7, God intends to wipe out the entirety of humanity; by the next verse, a righteous Noah has "found favor" with God and thus managed to spare the future of humanity. God also intervenes on behalf of the ark's inhabitants in chapter 8 when God blows a wind to make the water subside (Gn 8:1).

But lest readers of Scripture come under the impression that creation operates with an absolute orderliness, the Book of Job serves to complicate the system. Job becomes an unwitting participant in a bet between God and the satan (understood as "a figure in the divine assembly, not the later devil"[49]) as the latter wagers that he can make the most faithful of God's servants curse God when exposed to hardship (Job 1:10-12). Steeped in a worldview which maintains that suffering is the direct result of sin, Job's friends attempt to convince him that his suffering was brought upon himself. Job, however, remains steadfast in asserting his innocence and demands accountability from God. Believing that creation is meant to be ordered such that it functions in correspondence to human behavior, Job faults God for not maintaining an orderly creation.[50]

Although Job is correct in asserting his innocence, as evidenced by God's rebuke of Job's friends (Job 42:7), his challenge to the injustice of his situation is a flawed one. When Job confronts God, God responds by presenting the portrait of a world that is much larger than Job. God responds with discourses on great, fearsome beasts

47 Ibid., 55.
48 Ibid., 48.
49 Ibid., 69.
50 Ibid., 74-75.

– the behemoth (Job 40:15) and the Leviathan (Job 41:1) – which God has created and which only God can approach because of their great power. These beasts represent an unconquerable chaos intrinsic to the world. God also points out the seemingly nonsensical nature of an ostrich, which stupidly lays its eggs where they can be trampled upon (Job 39:14-15).[51] Even Godself appears to Job in the presence of something generally associated with a chaotic and destructive natural disaster – the whirlwind.[52] It is misleading to make an appeal to injustice to criticize a worldly order that does not correspond directly to human activity, because a mysterious chaos is intrinsic to the created order. God's response "expands Job's horizon to the point where he deeply grasps that God's love does not act according to the rules of retribution which a penal view of history insists upon, but like all true love operates freely in a world of grace that completely enfolds and permeates him, even in pain."[53] Chaos and suffering are intrinsic to creation and cannot be understood through juridical human rationale, but nevertheless, God is present in both.

This hearkens back to Keller's point, made in the introduction: the sea, the deep, or the chaos in Genesis 1 provides the material for creation and does not entirely dissipate after God's creative activity. Far from being evil, the chaos maintains its place in a creation which God calls "good." As Fretheim points out, it would make little sense for God to give the instruction to "fill the earth and subdue it" (Gn 1:28) if the world were already subdued; in addition, the curse on the woman in Genesis *intensifies* the pain of childbirth, implying that some pain was already present in the world even prior to what is read as the original sin.[54]

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51 E.A. Johnson, *Ask the Beasts*, op. cit., 270.

52 T.E. Fretheim, *Creation Untamed*, op. cit., 77.

53 E.A. Johnson, *Ask the Beasts*, op. cit., 271.

54 T.E. Fretheim, *Creation Untamed*, op. cit., 41-42. This understanding of how sin interacts with the natural world is not unlike that of Karl Rahner, who asserts that although human struggles like "toil, ignorance, sickness, pain and death" must be somehow different

The awareness of other ancient creation stories in the modern era have led some to read the first chapter of Genesis as a battle between God and the chaos, paralleling the battle imagery used by the Enuma Elish and Ugaritic texts.[55] This theory posits that creation occurs when the orderliness of the divine overcomes the primordial chaos; the chaos of the waters in Genesis 1 thus become identified with the enemy to be defeated.[56] However, others have used a linguistic analysis of Genesis and the creation myths of the ancient Near East to conclude that "the background of the Genesis creation story has nothing to do with" this theory.[57] Rather, as the instruction to subdue the earth, the flood, and God's conversation with Job show, the chaos has not been destroyed, but remains an embedded and often destructive force within creation. The fact that chaos and destruction remain within the cosmos is not the problem; rather "the problem is the habituation to an order of symmetrical, fixed identities, an order expunged of chaos."[58] And although some texts demonstrate an eschatological hope for the end of chaos, destruction, and pain (e.g., Romans 8), these texts generally refer to destruction or pain that is futile and/or the result of sin, rather than destruction that is a necessary element of the natural world.

However, if it is possible to assert that chaos is not a problem, this raises another issue: what to do with eschatological understandings that do away with chaos, decay, or the sea itself. If decay is a vital part of ecological systems, as demonstrated in the first section, what is there to do with a passage such as Romans 8:20-23? It reads: "For

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because of the existence of sin, these things are part of how the natural world works and thus must be assumed to have existed since the beginning. Karl Rahner, *Foundations of Christian Faith: An Introduction to the Idea of Christianity,* trans. from German W.V. Dych The Seabury Press, New York 1978, 115.

55 C. Keller, *No More Sea,* op. cit., 187.

56 D. Tsumura, *Creation and Destruction: A Reappraisal of the* Chaoskampf *Theory in the Old Testament*, Eisenbrauns, Winona Lake 2005, 190.

57 Ibid., 143.

58 C. Keller, *No More Sea,* op. cit., 193.

the creation was subjected to futility, not of its own will but by the will of the one who subjected it, in hope that the *creation itself will be set free from its bondage to decay* and will obtain the freedom of the glory of the children of God. We know that the whole creation has been groaning in labor pains until now; and not only the creation, but we ourselves, who have the first fruits of the Spirit, groan inwardly while we wait for adoption, the redemption of our bodies (emphasis mine)."

It is first important to note that Paul ties together the fate of humanity and the fate of creation. Creation and humanity groan together; the resurrection of the body is bound up with a renewal of the earth.[59] However, deeper understanding of the passage comes with an analysis of how the image of "labor pains" is used.

Conrad Gempf analyzes the ways in which the New Testament utilizes the imagery of "labor pains" or "birth pangs" and concludes that, while there is sometimes a productive or positive outcome implied by the metaphor, this is not always the case.[60] Often, it is more illustrative of the fact that for women in the ancient world, pregnancy and labor were a dangerous endeavor.[61] Therefore, lacking reference to a positive outcome, this passage is one example of the biblical image of birth pangs that connotes a theme of helplessness and frustration.[62] The labor pains with which creation groans are not resolved via a birthing process but are instead connected to creation's subjection to futility – in fact, Paul must mix metaphors and assert humanity's *adoption* in order to express a hopeful message,[63] which

59 J. Moo, *Continuity, Discontinuity, and Hope: The Contribution of New Testament Eschatology to a Distinctively Christian Environmental Ethos*, Tyndale Bulletin 61(2010)1, 28-29.

60 C. Gempf, *The Imagery of Birth Pangs in the New Testament*, Tyndale Bulletin 45(1994)1, 126.

61 Ibid., 122.

62 Ibid., 124.

63 Ibid., 126.

is not that the pain of creation will be productive, but that it will eventually end.[64]

Carrying this reading further, Laurie J. Braaten asserts that the groaning of creation can be associated with mourning rituals.[65] According to Braaten, there are nine instances in the Hebrew prophets in which creation is said to mourn because of human sin or the subsequent divine judgement.[66] In each case, the motif functions as a lament for the unjust suffering of creation.[67] While Paul was most likely familiar with this motif in the prophets, he probably was not aware of the destruction involved in carbon cycling. When reading Romans 8 through this lens, then, creation seems to be lamenting its bondage to the effects of sin which cause decay, frustration, and futility.

Taken together, these texts lend five important ideas to a theological interpretation of destruction and creation:

First, destruction operates within a framework of moral order. Whether the flood in Genesis, the groaning creation in Romans, or the law codes in the Torah, excessive destruction appears as a consequence of sin and operates under a certain understanding of the order of the world. For the biblical texts, destruction is often a matter of justice.

Second, God is held accountable to that order. As Fretheim asserts, God acts as a mediator of the destruction that is ultimately caused by human violence. This posits God as existing within the order of the world and acting according to its rules, not as an external force acting upon the world. God is also held accountable to the law which God has given when Israel calls out for God's justice in the imprecatory psalms.

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64 Ibid., 124.

65 L.J. Braaten, *The Groaning Creation: The Biblical Background for Romans 8:22*, Biblical Research 50(2005), 23.

66 Ibid., 29.

67 Ibid., 31.

Third, creation and destruction both properly belong to God. The imprecatory psalms also make clear that justice is for God to carry out. In Deuteronomy, God asserts Godself as the one who kills and gives life, who heals and wounds. Genesis 1 and 2 reveal God as Creator, while the book of Job illuminates that God's creative capacity is beyond human understanding.

Fourth, there is eschatological hope for the end of undue suffering. Romans points to a hope that the day will come when the earth need no longer lament the effects of human sin. However, there is a distinction to be made between destruction or decay that is a result of sin and that which is part of natural processes. The latter need not necessarily disappear in the eschaton.

Fifth and finally, creation contains a certain amount of chaos. Existing alongside order, this chaos can be dangerous or destructive, as evidenced by the flood, the earth to be subdued, the behemoth, and the Leviathan. The danger of the chaos, though, does not make it evil – it is included within the creation called "good." In fact, it is the interaction of order and chaos that allows for "what is novel, interesting, creative, and complex to take place."[68] The existence of chaos is what permits creative potential to remain part of the world, thus allowing persons to take part in creative processes.[69]

4. CO-CREATION AND ECOLOGICAL DESTRUCTION

In *Laudato Si'*, Francis echoes the understanding that creation's chaos allows for creative potential: "creating a world in need of development, God in some way sought to limit himself in such a way that many of the things we think of as evils, dangers or sources of suffering, are in reality part of the pains of childbirth which he uses to draw us into the

68 C. Keller, *No More Sea*, op. cit., 195.
69 T.E. Fretheim, *Creation Untamed*, op. cit., 86.

act of cooperation with the Creator."[70] *Gaudium et Spes* and *Laborem Exercens* cite human work as participation in the activity of God, thereby making persons "co-creators" with God.[71] Although this is considered a bold theological claim by some,[72] proponents of the idea situate it as a necessary part of humans being created in the image and likeness of God. Claude Tresmontant, for instance, asserts that the ability of persons to create themselves and participate in their own transformation is precisely what God intended by creating persons in God's own image.[73] God's creative activity and humankind's creative activity exist in a symbiotic relationship.[74] Indeed, human co-creation is crucial for persons to become holy, since holiness requires an active participation in understanding and not just passive obedience.[75] In *Laborem Exercens*, John Paul II couches the idea in the human vocation of labor, where God works as *the* Creator, and humans, made in God's image, are called to act as co-creators when they work.[76] According to this model, humans, in their very being, are created for creativity. Work is not just some wearisome task that

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70 Francis, *Laudato Si'*, op. cit., 80.

71 P.A. Lamoureux, *Commentary on 'Laborem Exercens' ('On Human Work')*, in: *Modern Catholic Social Teaching: Commentaries and Interpretations*, eds. K. Himes *et al.*, Georgetown University Press, Washington 2005, 394. This concept has also been used extensively in discussions of bioethics and sexual ethics, but such an analysis is outside the scope of this paper.

72 D. Hollenbach, *Human Work and the Story of Creation: Theology and Ethics in 'Laborem Exercens'*, in: *Co-Creation and Capitalism: John Paul II's 'Laborem Exercens'*, eds. J.W. Houck, O.F. Williams. University Press of America, Washington 1983, 60.

73 C. Tresmontant, *A Study of Hebrew Thought*, trans. from French M.F. Gibson, Desclee Company, New York 1960, 151.

74 Ibid.

75 Ibid., 155.

76 D. Hollenbach, *Human Work and the Story of Creation: Theology and Ethics in 'Laborem Exercens'*, op. cit., 63-64. As noted above, the encyclical puts forth the idea of co-creators without using the term itself: "Man is the image of God partly through the mandate received from his Creator to subdue, to dominate, the earth. In carrying out this mandate, man, every human being, reflects the very action of the Creator of the universe." John Paul II, *Laborem Exercens*, op. cit., 4.

must be carried out for the sake of survival, but an invitation to participate in the divine activity of creation for the benefit of both humans and creation.

When the application moves from the concept of work to the concept of environmental development such as that found in *Laudato Si'*, however, the claim becomes even bolder. If natural, creative, ecological processes include decay and destruction, as demonstrated above, what does that mean for human activity that is "co-creative"? Philip Hefner's theological theory of the human as "created co-creator" provides a way forward. Given the thorough nature of his definition, it is worth quoting at length: "Human beings are God's created co-creators whose purpose is to be the agency, acting in freedom, to birth the future that is most wholesome for the nature that has birthed us – the nature that is not only our own genetic heritage, but also the entire human community and the evolutionary and ecological reality in which and to which we belong. Exercising this agency is said to be God's will for humans."[77]

Hefner's proposal is of particular value to this discussion because of his emphasis on humanity's situatedness in the rest of the natural environment. He asserts that, as created beings, humans are both free and conditioned: "To be created is to be derived, to be dependent upon antecedent factors (environmental, biological, cultural) as well as contemporary sources (environmental, cultural)."[78] It is from this set of conditions that humans' free, co-creative activity emerges, in alignment with God's will for humankind. For Hefner, humans are able to derive some knowledge about their meaning and purpose from their placement in nature and their contribution to it.[79] This assertion does not assume that what "is" is what "ought to be," but relies on the

77 P. Hefner, *The Human Factor: Evolution, Culture, and Religion*, Fortress Press, Minneapolis 1993, 27.

78 Ibid., 36.

79 Ibid., 41.

theological understanding that "nature is the medium through which the world, including human beings, receives knowledge, as well as grace."[80] Humans gain knowledge not only of what exists in their environment, but what processes are necessary for its functioning and flourishing.[81] We can therefore understand our purpose as humans by understanding how best to contribute to the wholesome flourishing of our environment.

Because of the tendency to link destruction and chaos with evil, as Keller observes happening in both history and theology, those who participate in projects that entail destructive activities might be inclined to see destruction as a necessary evil. Few would say that they desire to willingly perpetrate evil – but if destruction is necessary for humans to survive, what else is to be done? However, the equation of destruction with evil is not only theologically flawed and ecologically unrealistic; it also leaves persons and societies with no ethical guideline about how to destroy *well* in the midst of creative activity. As Manuel G. Doncel asserts, following Hefner, humans are conditioned by the ecological systems, social groups, and biology with which they find themselves – but a conditioned existence gestures toward an existence that belongs, and belonging comes with an acknowledgement of physical limitation as well as ethical obligation to other humans and to the rest of the environment.[82] If we are to take seriously Hefner's hypothesis that humanity's purpose can be drawn from observable nature, we must acknowledge that humans exist within ecological systems in which life depends upon the destructive capacities of that same ecological system, and that those systems contain chaos as much as they contain order. Humans must therefore theologically reflect on the destructive and chaotic aspects of nature

80 Ibid., 42.

81 Ibid., 40.

82 M.G. Doncel, *The Kenosis of the Creator and of the Created Co-Creator*, Zygon 39(2004)4, 794-795.

when discerning how to best participate in the ecological systems of which they are a part.

However, and importantly, acknowledging processes of destruction within ecological systems as well as within a theological framework does not lead to an unmitigated approval of destruction, but instead limits the exercise of anthropogenic environmental degradation. If viewed in theological perspective, humans are co-creators with God, and so they are bound to the creative limits set by the Creator. As argued above, God's destructive activity operates within a moral order that holds God accountable to it, may well continue in the eschaton, and works hand in hand with creative activity. And since creation and destruction both properly belong to God, humans are bound to these characteristics of destructive activity as well when working as co-creators. Within this framework, just or natural destruction – that is, destruction not caused by sinfulness such as over-consumption of material goods – functions in very specific and limited ways which ultimately work to further creative processes rather than impede them. Destructive capacities found in nature work toward the maintenance of life in the same way as God is seen acting in Scripture. For the "created co-creator," chaos and struggle are integrated into the created order of the world insofar as they provide the fertile ground to cooperate with the Creator in a creative process.[83]

Human interaction with the environment often necessitates destruction – after all, with very limited exceptions,[84] human creative activity requires the destruction of something else. The material for creation must come from somewhere. As demonstrated in the first section, this is true of the carbon cycle, food webs, and evolution; it

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83 See P.A. Lamoureux, *Commentary on 'Laborem Exercens' ('On Human Work')*, op. cit., 394.

84 Perhaps the only exceptions are creative enterprises such as music-making or writing, assuming that neither is disseminated on paper.

is also true of buildings, infrastructure, transportation mechanisms, clothing, and other material facets of human reality. If chaos and destruction are acknowledged as necessary elements of the world and its ecosystems, it becomes possible to instead cooperate in processes of destruction that are oriented toward a holistically creative framework in which the environment can flourish.

One example of how this might look in practice is "prescribed fire," which is a natural resource management technique that is both destructive and creative. Because of human activity, natural fires are excluded from certain environments. This allows invasive fire-sensitive species to grow alongside species that, over the course of natural fires, had been naturally selected for fire-insensitivity.[85] By burning parts of environments like these, ecosystems which had been imbalanced by invasive species or lack of natural fire are rebalanced. The practice is destructive for clear reasons, but through the destruction of some areas or species, the environment increases in richness and biodiversity among native species and becomes resistant to the much more destructive fire caused by anthropogenic climate change.[86] By placing destruction within the framework of creation, it becomes possible to understand both creation *and* destruction as parallel elements within the same movement toward an ethical relationship with the earth. A healthier creation – one that is native and more diverse – is brought about by cooperating with naturally-occurring destructive processes.

Cooperation between destruction and creation can also be observed in the example of sustainable logging practices. Creative projects often necessitate the use of wood, which can only be attained via the destruction of trees; but how that destruction is carried out may make

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85 A.C. Livingston, J.M. Varner, E.S. Jules, J.M. Kane, L.A. Arguello, *Prescribed Fire and Conifer Removal Promote Positive Understorey Vegetation Responses in Oak Woodlands*, Journal of Applied Ecology 53(2016), 1604.

86 Ibid., 1610.

the difference between a sustainable practice and the degradation of an entire ecosystem. For instance, reduced-impact logging in Malaysia has been able to maintain the integrity of the Deramakot Forest by restraining the amount and kind of annual harvesting and promoting the practice of rehabilitation planting.[87] Alongside the maintenance of the Deramakot Forest ecosystem, such a practice is attentive to the carbon cycle through the conservation of carbon sinks. A key to sustainability is thus not avoiding destruction altogether, but employing it in ways that work with the natural ecosystem and ecological processes.

5. CONCLUSION

Destruction, decay, struggle, and chaos are intrinsic elements in the earth's ecosystems that are necessary for the proper functioning of ecological processes. This fact, observable in the natural environment, is paralleled by a biblical framework which posits destructive activity as occurring within a moral order, either as caused by human sinfulness, mediated through God's presence within the order, or as a result of the mysterious chaos that is inherent in creation.

The type of environmental degradation which has caused the current ecological crisis is undoubtedly the result of human sinfulness, at least in part.[88] For instance, *Laudato Si'* explicates that humans have wrongfully interpreted God's call in Genesis to have "dominion" over the earth as permission to exploit the earth, leading to sinful ecological destruction.[89] One might point to the overuse of fossil fuels, the commodification of water, or the mass extinction of species as evidence. Aside from identifying sinful destruction, however,

87 P. Lagan, S. Mannan, H. Matsubayashi, *Sustainable Use of Tropical Forests by Reduced--Impact Logging in Deramakot Forest Reserve, Sabah, Malaysia*, Ecological Society of Japan 22(2007), 416.

88 Francis, *Laudato Si'*, op. cit., 2.

89 Ibid., 66-67.

an analysis of ecological and theological frameworks aids in an understanding of how natural processes of decay and destruction should be thought of as building toward the enrichment of creation and not as an inevitable evil. As Keller argues, a shift away from fearing chaos to accepting (and even loving) it as a part of creation that cannot be reduced to a logical or juridical system will help human communities take a step toward interacting holistically within the environment rather than trying to conquer it.[90] If humans are to participate in God's creative activity as "created co-creators," and thus fulfill their purpose as humans, the reality of destruction within environmental systems must be acknowledged and analyzed so that humans can learn to participate in natural processes of destruction rather than wreaking havoc upon the earth.

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90 C. Keller, *No More Sea*, op. cit., 198.

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EVOLUTIONARY THEOLOGY: A NEW CHAPTER IN THE RELATIONS BETWEEN THEOLOGY AND SCIENCE

Abstract. Despite many arduous attempts to reconcile the separation between theology and science, the common ground where these two areas of intellectual inquiry could converge has not been fully identified yet. The purpose of this paper is to use evolutionary theology as the new and unique framework in which science and theology are indeed brought into coherent alignment. The major step in this effort is to acknowledge that theology can no longer dialogue with science but must assume science and its method as its conceptual foundation. This approach successfully does away with any tensions that may arise between the two disciplines and establishes a firm ground on which neither of them will turn into ideology. Moreover, it enables the dialogue with contemporary scientific atheism on solid grounds and the restoration of the credibility of theology in the secularist culture of the day.

Keywords: evolution; hermeneutics; rationality; picture of the world; relations between science and theology

1. INTRODUCTION

It is beyond doubt that religion is older than science. The relations between science and religion date back to very birth of science, that is, to the turn from the 7th to the 6th century BC when representatives of the Ionian school of philosophy launched an enduring process of *demythologization* of nature.[1] Their strong belief in the power of the human mind to unveil nature's workings resulted in a progressive

1 O. Pedersen, *The Two Books: Historical Notes on Some Interactions Between Natural Science and Theology*, Vatican Observatory Foundation, Vatican 2007, 4-7.

depopulation of the pantheon of gods that eventually gave rise to one of the most fundamental principles of science: *methodological naturalism*. In short, nature can be only explained by nature.

It took about two thousand years of considerable intellectual effort to integrate science and religion into a contrapuntal relationship, achieved in medieval thought especially through the works of St. Thomas Aquinas.[2] Unfortunately, the condemnations of 1277 by the bishop of Paris, Etienne Tempier, led philosophers to a growing distrust of theologians. As a result, philosophy slowly begun to disengage from theological inquiry and develop without reference to religion as its motivating factor.[3] This separation dominated modern times and hasn't been restored until the present day.

Although commonly used in most of the systematic studies on the subject, the expression 'relations of science and religion' means rather 'relations of science and theology'. It is not difficult to see that such relations do not concern religion as a whole, which comprises not only the doctrine but the rituals, morality and institutions for its promotion and teaching as well. As for doctrinal issues, which play a key role in both science and theology, the pursuit of truth is their main objective. In other words, it is the interaction between the scientific and theological discourse that is considered here.

The goal of this paper is to offer some preliminary considerations on how science and theology can be brought back into a fruitful synthesis within a new theological paradigm known as *evolutionary theology*, thereby giving rise to a new chapter in their relations. The synthesis proposed respects the distinct objects of inquiry of science and religion. At the same time, it eliminates potential areas of conflict. The goal will be pursued in the following order. Firstly,

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2 E.g. J. Pieper, *Scholasticism: Personalities and Problems of Medieval Philosophy*, St. Augustine Press, South Bend 2001.

3 J. Mączka, *Średniowieczny konflikt nauki z teologią (potępienie z 1277 r.)*, in: M. Heller, Z. Liana, J. Mączka, W. Skoczny, *Nauki przyrodnicze a teologia: konflikt i współistnienie*, OBI – Biblos, Kraków – Tarnów 2001, 115-126.

the specificity of the Thomistic synthesis of faith and reason will be presented to provide a suitable background for further analysis. Secondly, the existing typologies concerning the relations of science and religion will be briefly discussed to identify a most suitable type or, rather, a model which will be used in this study to characterize evolutionary theology. Thirdly, the modern understanding of the nature of theological language will be surveyed to establish its dependence on the important hermeneutical category of the *picture of the world*. Updating the image of the world with the latest scientific developments will allow us to justify the reinterpretation of the theological doctrine. Lastly, it will become evident that evolutionary theology integrates science and religion in a flexible way, so that any future adjustments of the image of the world will not disrupt the integrity of their synthesis and might lead to new theological insights. As a result, it will be suggested that the conflict between science and religion arises only when either of the two turns variables into absolutes.

2. THE SYNTHESIS OF AQUINAS

As mentioned above, the philosophy and theology of St. Thomas Aquinas are commonly considered to be the climax of medieval thought, for they achieve a unique synthesis of faith and reason.[4] Replacing the prevalent Neo-Platonism with the philosophy of Aristotle as the conceptual foundation of theology was but an extremely courageous and ingenious move made by Aquinas, through which the metaphorical language of the former gave way to the conceptual clarity and precise logic of the latter. Following Aristotle, Aquinas claimed that knowledge of nature is attained through an

4 J. Pieper, *Scholasticism: Personalities and Problems of Medieval Philosophy*, op. cit.; John Paul II, *Fides et Ratio*, Vatican City State 1998, art. 43-44.

intellectual grasp of the substance of things.[5] The knowledge of the substance of things does not exceed the capacity of the human intellect, which has a limited understanding of the Divine substance. The intellect, however, arrives at the simplest truths that God exists and that His substance has certain attributes as the first principle.[6] This is possible due to the likeness of things created to their Creator. Consequently, faith becomes the natural extension of reason in providing insight into the truths that lie beyond reason's natural powers. Although the knowledge of substances proceeds through their representations as common natures,[7] the ontology of substance is assumed to underpin reality at its fundamental level. In short, it is the fundamental ontology.

It was only three years after Aquinas' death that the 1277 condemnations were announced by the bishop of Paris, Etienne Tempier, following the allegedly heterodox interpretations of the Aristotelian writings. The condemnations resulted in a profound separation of faith and reason. The contrapuntal relationship established by Aquinas quickly turned into a marked opposition manifesting itself in such classical episodes as the Galileo case or the Darwin case. The Darwin case continues to spark much controversy, bringing forth radically contrasting stances: (1) *atheism*: the claim that Darwinism has effectively explained religion away;[8] and (2) *biblical fundamentalism*: the rejection of Darwinism on the grounds of its materialistic character and its obvious disagreement with a literal interpretation of the biblical account of creation.[9] In addition to this,

5 St. Thomas Aquinas, *Summa Contra Gentiles* I, 3, 7.

6 St. Thomas Aquinas, *Faith, Reason and Theology. Questions I-IV of his Commentary on the 'De Trinitate' of Boethius*, Pontifical Institute of Medieval Studies, Toronto 1987.

7 E.g. J. Owens, *Cognition: An Epistemological Inquiry*, Center for Thomistic Studies, Houston 1992, 139-165.

8 E.g. R. Dawkins, *The God Delusion*, Bantam Books, New York 2006.

9 E.g. G.J. Keane, *Creation Rediscovered: Evolution and The Importance of the Origins Debate*, TAN Books and Publishers, Rockford 1999.

there are more sophisticated strategies of denying Darwinism known under the general umbrella of *intelligent design*.[10] Such situation is highly unsatisfactory from the epistemic point of view, for science yields knowledge on the work of the Divine creation and as such should not contradict revelation. Despite the numerous efforts to reconcile the two disciplines, there persists a belief that science and religion remain in conflict. Unfortunately, this belief may become even more ingrained as the current and rapid development of the cognitive sciences challenges some of the fundamental concepts of anthropology.[11]

3. WAYS OF RELATING SCIENCE AND RELIGION

The complexity of relations between science and religion following their breach is most fully captured in the typology proposed by Ian G. Barbour,[12] who distinguishes four models of relations: conflict, independence, dialogue and integration. Another one formulated by Dominique Lambert names three such models: integration, separation and explication.[13] Since Lambert's typology is a bit too broad and, most importantly, the model of integration implies dominance of religion over science, or vice versa, rather than a fruitful synthesis, the typology put forward by Barbour seems more appropriate for the purpose of this study.

According to Barbour's taxonomy, the conflict model assumes that religion and science are incompatible and that only one of them is a

10 E.g. M. Behe, *Darwin's Black Box: The Biochemical Challenge to Evolution*, The Free Press, New York 1996; W.A. Dembski, *The Design Inference: Eliminating Chance Through Small Probabilities*, Cambridge University Press, Cambridge 1995.

11 E.g. W.P. Grygiel, *Konceptualne wyzwania nauk kognitywnych dla antropologii filozoficznej i teologicznej*, in: *Teologia fundamentalna wobec współczesnych wyzwań nauk o człowieku*, ed. P. Artemiuk, Płocki Instytut Wydawniczy, Płock 2019, 120-143.

12 I.G. Barbour, *When Science Meets Religion*, Harper One, New York 2000.

13 D. Lambert, *Sciences et théologie – Les figures d'un dialogue*, Lessius, Bruxelles 1999.

legitimate source of knowledge. This type of model is evident in the stance of *scientific materialism*, which regards religion as a delusion. The only true knowledge is scientific knowledge, which is subject to testing and objective analysis. The opposing stance, namely that of *biblical literalism*, considers the Bible as the only source of truth, and scientific knowledge must be interpreted according to what the Bible says. It remains beyond doubt that this model precludes any reconciliation between science and religion. A more in-depth analysis would easily reveal an array of unjustified premises entailed by this model entails, but this falls beyond the scope of this study.

As Barbour moves to the second type of relations between science and religion, namely that of independence, it becomes gradually obvious that with each next type he instills more optimism that a reconciliation is possible and, as it will eventually turn out, entirely natural. Independence avoids conflicts by allocating science and religion into separate compartments by articulating their radical differences in "the questions they ask, the domains to which they refer and the methods they employ."[14] In regard to the disjunction of domains, science is the study of objective facts, while the focus of religion is that of personal values. In other words, science deals with the "what" and religion deals with the "why." Thus, they cannot conflict because they have different functions.

The dialogue type is a further relaxation of independence in the direction of bringing science and religion together and making their interaction more constructive. While it holds that religion and science are mostly separate and lack conceptual unity, it admits that in some cases an explanation in one field will have implications for the other. As Barbour points out: "In comparing science and religion, dialogue emphasizes similarities in presuppositions, methods and concepts, whereas independence emphasizes the differences."[15] For instance,

14 I.G. Barbour, *When Science Meets Religion*, op. cit., 17.
15 Ibid., 23.

the apparent sharp cut between science and religion as disjunctively referring to the objective and subjective can be alleviated by stressing the impact of the creativity of the researcher's mind in the formulation of a scientific theory. This is best evidenced by Einstein's famous "free interplay of ideas."[16]

The final type that Barbour describes is that of integration. On this view, both religion and science do have the authority to reveal the truth and, most importantly, the two perspectives are inextricably intertwined. One's theological perspective shapes how one uses and interprets science, but science also influences how we view God and his revelation and actions in the world. According to Barbour, this stance allows for a systematic synthesis in which science and religion contribute to a coherent worldview, thereby bringing the conflict between science and religion to a definite close. This synthesis calls for a new metaphysics that will constitute a shared conceptual scheme to warrant a space of common inquiry.

4. WHAT IS EVOLUTIONARY THEOLOGY?

Evolutionary theology is a novel paradigm that assumes as its conceptual foundation the evolutionary dynamic picture of the Universe, in which the history of humanity is deeply intertwined with the history of the Universe. According to the dynamic picture, the currently observed great complexity and diversity of the living organisms results from the process of their gradual evolution from simpler forms with natural selection as its main mechanism.[17] The beginnings of evolutionary theology reach back to the fifties of

16 A. Einstein, *Bertrand Russell a myślenie filozoficzne*, in: *Albert Einstein. Pisma filozoficzne*, ed. S. Butryn, trans. from English K. Napiórkowski, De Agostini Polska – Ediciones Altaya Polska, Warszawa 2001, 255.

17 E.g. F.J. Ayala, *Dar Karola Darwina dla nauki i religii*, transl. from English P. Dawidowicz, Wydawnictwo Uniwersytetu Warszawskiego, Warszawa 2009.

the previous century to the works of Teilhard de Chardin[18] and Karl Rahner.[19] The major contribution to its establishment and development, however, comes from the works of such renowned contemporary scholars as Arthur Peacocke,[20] John Haught,[21] Dennis Edwards,[22] Francisco J. Ayala,[23] and Michael Heller.[24] Evolutionary theology is a highly interdisciplinary project operating at the nexus of theology, philosophy, natural sciences and humanities. By saying that theology is evolutionary, however, one by no means implies the relativization of the Divine truths. Rather, one points only to the shift of the conceptual basis of the theological expression from the pre-scientific *static* to the scientific *dynamic* picture of the world.[25] Inasmuch as many interesting and promising results have already been obtained evolutionary theology still needs much refinement and consolidation in order to fully merit the designation of a paradigm, that is, a commonly shared system of beliefs on the nature of theology and the methodological means to attain progress in theological

18 P.T. de Chardin, *The Phenomenon of Man*, William Collins, London 1959.

19 K. Rahner, *Christology Within an Evolutionary World*, in: K. Rahner, *Theological Investigations V*, Helicon Press, Baltimore 1966, 157-192.

20 E.g. A. Peacocke, *Theology for a Scientific Age*, Fortress Press, Minneapolis, 1993.

21 J. Haught, *Is Nature Enough?: Meaning and Truth in the Age of Science*, Cambridge University Press, Cambridge 2006; J. Haught, *God After Darwin: A Theology of Evolution*, Westview Press, Boulder CO 2008; J. Haught, *Making Sense of Evolution: Darwin, God and the Drama of Life*, Westminster John Knox Press 2010; J. Haught, *Resting on the Future: Catholic Theology for an Unfinished Universe*, Bloomsbury, New York – London – Oxford – New Delhi – Sydney 2015; J. Haught, *The New Cosmic Story: Inside Our Awakening Universe*, Yale University Press, New Haven – London 2017.

22 E.g. D. Edwards, *Bóg ewolucji: teologia trynitarna*, trans. from English Ł. Kwiatek, Copernicus Center Press, Kraków 2016.

23 F.J. Ayala, *Dar Karola Darwina dla nauki i religii*, op. cit.

24 E.g. M. Heller, *Sens życia i sens Wszechświata*, Tarnów, Biblos 2002, 135-151.

25 E.g. J. Turek, *Filozoficzno-światopoglądowe implikacje dynamicznego obrazu wszechświata*, in: M. Heller, S. Budzik, S. Wszołek, *Obrazy świata w teologii i w naukach przyrodniczych*, op. cit., 25-145.

knowledge.[26] The incentive to engage evolutionary scenarios into theological thought has been clearly advocated by Vatican II in the following statement: "History itself speeds along on so rapid a course that an individual person can scarcely keep abreast of it. The destiny of the human community has become all of a piece, where once the various groups of men had a kind of private history of their own. Thus, the human race has passed from a rather static concept of reality to a more dynamic, evolutionary one. In consequence there has arisen a new series of problems, a series as numerous as can be, calling for efforts of analysis and synthesis."[27]

5. METHODOLOGICAL ISSUES

The proper argument that evolutionary theology does indeed set a new chapter in the relations between science and theology will commence with several methodological remarks on the nature of this novel theological approach. Most generally, theology aims at the conceptual exposition of the content of revelation. Since it is always man who is the recipient of the Divine revelation, theology is conditioned by the *relation* between man and God, that is, the encounter of the human mind with the revealed content.[28] This means that conceptual frameworks of purely natural origin must be used to provide a proper expression for such content and, thus, that an objective theological cognition is impossible. Consequently, theological expression can never escape the significant tension between the finite character of the conceptual framework and the infinity of God. In other words, concepts can never reach the Divine essence in a literal sense, but only

26 E.g. W.P. Grygiel, *What is invariant? On the possibility and perspectives of the evolutionary theology*, ‚Studia Koszalińsko-Kołobrzeskie 25(2018), 83-101; D. Wąsek, W.P. Grygiel, *Przyczynki do teologii ewolucyjnej*, in: *Powstanie człowieka w ujęciu interdyscyplinarnym*, ed. T. Maziarka, Copernicus Center Press, Kraków 2019, 55-171.

27 Vaticanum II, *Gaudium et spes*, Art. 5.

28 Vaticanum II, *Dei Verbum*, Art. 11, 12.

by means of metaphorical language. Each metaphor is equipped with a subjective component because their proper interpretation demands involvement on the part of the recipient. The literal reading of these forms of expression may lead to serious error and absurd inferences.[29]

This set of ideas was developed by two famous 20th-century theologians, Edmund Schillebeeckx and Karl Rahner. In one of his most important works on theological hermeneutics, Schillebeeckx proposed that the Divine revelation is never received as a *nuda vox Dei*. Rather, each expression of the revealed content is coded in such a way as to permit a concrete recipient living in concrete times to read the Divine message.[30] Karl Rahner wrote that each dogma is like an *amalgam* uniting both variable and invariable elements: "The truths which from the dogmatic point of view are absolutely binding can be expressed and handed down by means of ideas (propagated de facto at a given period in time by means of models and accepted patterns of reasoning), conveyed inseparably with the with the basic doctrinal statement, and later on considered as having no binding power or even false."[31]

The process of communicating what is objective, essential and invariable with the concomitant elimination of contextual assumptions amounts to the development of a dogma and takes place according to specific criteria.[32] This point has been greatly captured by a contemporary American evolutionary theologian, John Haught, who states the following: "The deposit of the Catholic faith is not a smoothly rounded rock rolling down the corridors of time cushioned

29 E.g. D.B. Hart, *Chrześcijańska rewolucja a złudzenie ateizmu,* trans. from English A. Gomola, WAM, Kraków 2011.

30 E. Schillebeeckx, *O katolickie zastosowanie hermeneutyki,* trans. from German H. Bortnowska, Znak (1968)7-8(169-170), 978-981.

31 K. Rahner, *Dogmen und Theologiegeschichte – Gestern und Morgen,* Zeitschrift für katholische Theologie 99(1977)1, 6.

32 E.g. Z. Kijas, *Rozwój dogmatu i jego kryteria*, in: *Teologia fundamentalna. Vol. V: Poznanie teologiczne,* eds. T. Dzidek, Ł. Kamykowski, A. Napiórkowski, Wydawnictwo Naukowe PAT, Kraków 2006, 106f.

from changing cultures and fluctuating intellectual environments. Doctrine can and must develop if it is to be the basis of an enlivening spirituality for different periods of time. In fact, theology has always been one of the ways in which living religions have struggled to survive."[33]

It is now commonly maintained that any theological formulation depends on a specific *picture of the world*. According to Liana, the hermeneutical category of the picture of the world consists of two principal components: (1) "a certain complete set of convictions on the fundamental characteristics and the mode of the functioning of the Universe, man and cognition itself" and (2) "a certain intellectual background or a specific background knowledge of all possible cognitive behaviors of man with the theological and scientific cognition inclusive."[34] Also, there are two main ideas articulated in the hermeneutics of the image of the Universe. Firstly, all our beliefs including the religious, theological and scientific ones function in a broader context of cultural conditions. In short, they bear contextual character. Secondly, these conditions are subject to historical variability with its main element being the evolution of concepts used to form a mental representation of the objective reality. As mentioned above, religious beliefs engage elements of both religious and non-religious nature and the tools to regulate the non-religious component lie outside of the competence of religion.[35] This greatly concerns the changing picture of the world because it directly depends on the scientific knowledge of the structure of the Universe. Since religious beliefs must necessarily reflect the truth or, more precisely, be in its closest possible proximity, the unceasing improvement of the

33 J. Haught, *Resting on the Future*, op. cit., 29.

34 Z. Liana, *Teologia a naukowe obrazy świata*, in: *Wiara i nauka*, ed. J. Mączka, Wydawnictwo Uniwersytetu Jagiellońskiego, Kraków 2010, 70-71.

35 E.g. M. Heller, *Naukowy obraz świata a zadanie teologa*, in: *Obrazy świata w teologii i w naukach przyrodniczych*, eds. M. Heller, S. Budzik, S. Wszołek, Biblos, Tarnów 1996, 13-27.

picture of the world that they contain is of prime importance for their credibility.[36] It has already been clearly indicated by St. Basil that the deepening of the knowledge of the Universe results in the constant enrichment of the conceptual basis of theology, whereby more fitting analogies can be developed to refract the Divine essence.[37]

6. RESHAPING THE INTEGRATION

As one now turns to the detailed justification of the synthesis of faith and reason as exemplified by evolutionary theology, it is fitting to return briefly to the synthesis accomplished by St. Thomas Aquinas as the proper background for further analysis. After all, this is the last major synthesis where faith and reason were harmoniously integrated in a worldview which brings both the natural and supernatural realms into a coherent unity. Barbour indicated three possible versions of the integration model: *natural theology*, *theology of nature* and *systematic synthesis*. It is quite obvious that the synthesis of Aquinas does justice to the first version, for he devoted considerable effort to show how one can argue for the existence of God and justify some basic characteristics of the Divine essence accessible to the inquiry of reason alone.[38] The second version of integration, however, does not seem to apply as smoothly to the synthesis of Aquinas. Barbour points out that "in the theology of nature, the main sources of theology lie outside of science, but scientific theories may strongly affect the reformulation of certain doctrines, particularly the doctrine of creation and the human nature."[39] Although Aquinas does not operate with a contemporary notion of science, such reformulation

36 St. Augustine, *De Genesi ad litteram* I, 19-20.

37 St. Basil, *De legendis libris Gentilium*, 565 and 568.

38 For an exhaustive commentary of Aquinas' natural theology, see: N. Kretzmann, *The Metaphysics of Theism: Aquinas' Natural Theology in Summa Contra Gentiles I*, Oxford University Press, Oxford 1997.

39 I.G. Barbour, *When Science Meets Religion*, op. cit., 27-28.

does indeed occur within the conceptual shift from Neoplatonism to Aristotelianism. Considering that these systems comprised much of the knowledge on the nature of the physical reality at the time, the *theology of nature* version may be applied to Aquinas' synthesis in an extended sense. The two cases mentioned by Barbour in the quote above provide an excellent example in this regard. As for the third version of integration proposed by Barbour, it is clearly refracted in the synthesis effected in Aquinas metaphysics that is based on the real distinction between *esse* et *essentia*.[40] Understood in the Aristotelian sense of the ultimate principles of reality, this metaphysics implies the ontology of substances as the fundamental ontology underpinning all that exists.

The unifying power and conceptual clarity of the Thomistic metaphysics still sparks much interest among philosophers and theologians. However, it is rather the framework shift mentioned above that constitutes the "truly valuable" in Aquinas, whereby the transition to a new chapter concerning the relations between science and theology can proceed. Such shift was a *purification* because the metaphorical and symbolic language of Neoplatonism succumbed to the greater conceptual clarity and logical transparency of Aristotelianism. Interestingly enough, a very similar idea has been articulated in reference to the contemporary sciences by John Paul II in his letter to the Director of the Vatican Observatory, George Coyne, in which he stated that "science can purify religion from error and superstition; religion can purify science from idolatry and false absolutes."[41] Although the conceptual shift achieved by Aquinas took place before the onset of the contemporary scientific method, it

40 For an incisive introduction to the metaphysics of *esse*, see: F. Wilhelmsen, *Being and Knowing*, Preserving Christian Publications, Albany, New York 1995, 47-80.

41 John Paul II, *The Letter to the Reverend George V. Coyne, S.J., Director of the Vatican Observatory*, in: J. Russell, W.R. Stoeger, G.V. Coyne, *Physics, Philosophy and Theology: A Common Quest for Understanding*, Vatican Observatory Foundation, Vatican 1988, M13.

revealed some of the dynamics proper to the development of science accomplished with the use of this method. This in turn made the question of the fundamental ontology implied by the contemporary scientific theories a highly contentious issue.[42] Considering that the theoretical objects postulated by science change with the theories, John Worrall has proposed that these concern the structures rather than the objects that span the fundamental ontology of reality. This philosophical stance is called *structural realism*.[43] It is currently believed that the structural character of reality is most properly reflected in the *category theory*. This highly abstract mathematical framework rests on the priority of *relations (morphisms)* with respect to objects and has been suggested to constitute a fundamental ontology referred to by Michał Heller as the *category field*.[44] This is the updated version of his older idea of the *formal field* or the *field of rationality*.[45] Einstein suggested that the only feature that pertains to the mind-independent objective reality is its logical simplicity.[46] Following the nature of the contemporary scientific method, however, there are no general a priori assumptions that can be made regarding the specificity of a hypothetical fundamental ontology for even the most abstract formalisms may eventually turn out either empirically or theoretically inadequate (or both) and be replaced with ones which imply ontologies remaining at present entirely unknown. Since the growth of the scientific knowledge leads to the marked generalization of the theoretical description with concomitant increase in their predictive accuracy, the theoretical grasp on the fabric of the Universe

42 E.g. A. Chakravartty, *A Metaphysics for Scientific Realism*, Cambridge University Press, Cambridge 2007.

43 J. Worrall, *Structural realism: The best of both worlds?*, Dialectica 43(1989)1-2, 99-124.

44 M. Heller, *The field of rationality and category theory*, in: *Mathematical Structures of the Universe*, eds. M. Eckstein, M. Heller, S. Szybka, Copernicus Center Press, Kraków 2014, 441-457.

45 M. Heller, *Uchwycić przemijanie*, Wydawnictwo Znak, Kraków 1997, 236-238.

46 E.g. A. Einstein, *On The Generalized Theory of Gravitation*, Scientific American 182(1950)4, 13-17.

is considered to move to representations of increasing accuracy. To put things in short, as postulated by Karl Popper science yields only probable knowledge meaning that one cannot justify any ontology established with the use of the scientific method as fundamental, that is, assuming the status of metaphysics in the Aristotelian sense of the ultimate principles of reality.

Why is it then that evolutionary theology sets up a new synthesis between science and theology? Unlike the Aristotelian-Thomistic account it does not engage a conceptual framework that claims the status of a fundamental ontology. Like all theories formulated by means of the scientific method, the theory of evolution is subject to revision upon the acquisition of new empirical data that may contradict its current claims. Putting the matter in the words of John Paul II, the theological doctrine expressed with the use of the evolutionary picture of the world will always be open to purification once a new and more accurate theory of the origin and development of life in the Universe becomes available. It follows from this that any theology based on the scientific picture of the world admits a constant deepening of the exposition of Divine truths as more generalized conceptual frameworks become available.[47] Consequently, theology acquires a natural disposition for the reinterpretation of the doctrine. In addition to this, theology is automatically equipped to reject the God of the gaps argument by depriving it of its power. Since no ontology is final, no scientific statements can acquire an absolute character. Should this happen for whatever reason, either on the side of science or theology, their conflict becomes reality in an instant. In other words, the synthesis of science and theology as exemplified by evolutionary theology permanently does away with the possibility of one ever opposing or contradicting the other.

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47 E.g., W.P. Grygiel, *In what Sense Can the Scientifically Driven Theology Be Considered as a Continuation of the Doctrinal Tradition?*, The Theological Research 6(2018), 31-52.

Moreover, since the scientific picture of the world can never become a basis for a fundamental ontology, the claims of natural theology become markedly weaker. Such claims are additionally diminished by the belief of respected representatives of the scientific milieu that even advanced scientific theories, such as the general theory of relativity, unveil only a very small fragment of the vastness of the physical reality. According to Einstein, this turns a scientist into a believer: "His religious feeling takes the form of a rapturous amazement at the harmony of natural law, which reveals an intelligence of such superiority that, compared with it, all the systematic thinking and acting of human beings is an utterly insignificant reflection."[48]

The weakening of the claims of natural theology results in the practical denial of the possibility of proving the existence of God and inferring some of His basic attributes in favor of natural inquiry being only capable of establishing its own limits. Such limits, however, raise the question of what makes this inquiry possible or, phrased differently, what its metaphysical *a priority is*. As Heller puts it succinctly: "God is what makes the question marks have their answers."[49]

In regard to the second version of integration, namely that of the theology of nature, two points need to be made. First, evolutionary theology does call for an extensive doctrinal reinterpretation as foreseen by John Paul II in the aforementioned letter to the Director of the Vatican Observatory: "If the cosmologies of the ancient Near Eastern world could be purified and assimilated into the first chapters of Genesis, might not contemporary cosmology have something to offer to our reflections upon creation? Does an evolutionary

48 A. Einstein, *The Religiousness of Science*, in: A. Einstein, *The World as I See It*, Open Road Integrated Media, New York 2010, 37.

49 M. Heller, *Usprawiedliwienie Wszechświata*, Wydawnictwo Znak, Kraków 1995, 93. See also: W.P. Grygiel, *Człowiek wobec nauki: przez transgresję ku transcendencji*, in: *Po człowieku? Między kryzysem a nadzieją*, ed. M. Lipowicz, Wydawnictwo WAM, Kraków 2018, 289-312.

perspective bring any light to bear upon theological anthropology, the meaning of the human person as the *imago Dei*, the problem of Christology – and even upon the development of doctrine itself? What, it any, are the eschatological implications of contemporary cosmology, especially in light of the vast future of our universe? Can theological method fruitfully appropriate insights from scientific methodology and the philosophy of science?"[50]

It lies beyond the scope of this paper to address all the reinterpretative issues in the Christian doctrine that become evident upon the assimilation of the evolutionary picture of the world. Their full spectrum can be gleaned from the works of John Haught and Dennis Edwards referred to above. What seems to attract the greatest attention is, however, the problem of the original sin and how this concept fades into mythology gradually exorcised from the theological discourse as the evolutionary picture of the world penetrates its realm.[51]

The proper articulation of the third version of the Barbourian category of integration in the context of the contemporary science, namely that of the synthesis, is best accomplished as one shifts from the theory of evolution to quantum mechanics. There are extensive studies on how meaningful contributions to theology can be made by taking into account the picture of the world pertinent to the quantum level.[52] It turns out that quantum mechanics offers four independent formulations based on different mathematical structures that accord with the empirical evidence:[53] the Hilbert spaces, the Feynman path

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50 John Paul II, *The Letter to the Director of the Vatican Observatory*, op. cit., M11.

51 E.g. M. Majewski, *Grzech pierworodny. Nowe modele lektury Księgi Rodzaju w teologii katolickiej w kontekście współczesnych nauk przyrodniczych*, Ex Nihilo. Periodyk Młodych Religioznawców 17(2017), 1-31.

52 E.g., R.J. Russell, *Quantum Physics in Philosophical and Theological Persepctive*, in: R.J. Russell, W.R. Stoeger, G.V. Coyne (eds.), *Physics, Philosophy and Theology: A Common Quest for Understanding*, Vatican Observatory, Vatican City State 2000, 343-374.

53 M. Heller, *Elementy mechaniki kwantowej dla filozofów*, Biblos, Tarnów 2011, 140-147.

integrals, C*-algebras and the statistical approach based on density matrices. According to Heller, such a situation is consistent with Platonic ontology, in which all these formulations are but parallel representations of an objective physical reality to which the human intellect has restricted access. In short, it cognizes this reality only from a certain perspective. At this point it is hard to resist a far-reaching similarity of this mode of epistemic access to the physical reality with the nature of the theological discourse discussed above. Since this intriguing issue cannot be fully addressed within the scope of this article, it suffices to mention that the new synthesis of science and theology as exemplified by quantum mechanics provides a unique opportunity to support several valid formulations of the same theological doctrine. In other words, the synthesis allows for philosophical pluralism in theology and as such can be considered an extension and development of the Thomistic synthesis, which favors only one conceptual framework based on a certain reading of Aristotle.

7. CONCLUSIONS

In conclusion, it is worthwhile to observe yet another intriguing aspect of the integration between science and theology within the contemporary scientific method. However, since the method provides access only to the natural, or physical (contingent) order, it remains incapable of addressing the question of the existence of the Universe and its rational order. There exist layers of reality that transcend the capacity of the scientific method and, most importantly, they constitute the very reason why this method is altogether capable of providing rational answers. Theology claims to have epistemic access to such layers of reality, but it has no objective language to express its doctrine and must resort to conceptual frameworks provided by science and philosophy, which are products of the human intellect. There is no *nuda vox Dei*. Reflecting on these considerations, it turns

out that the new synthesis of science and theology reveals the richness of their mutual interdependency while retaining the autonomy of the objects they study.

In addition to the substantial development of the synthesis of science and theology achieved in the context of the scientific method, two other factors deserve attention. Firstly, this synthesis deploys a unique position in the dialogue with contemporary scientific atheism, for no claims within science itself can ever be considered final and the doctrinal statements can be properly adjusted to reflect current scientific developments. This should also greatly aid the restoration of the credibility of theology as a legitimate area of rational inquiry. Secondly, since doctrinal formulations are but representations of the intellectually impenetrable Divine reality, the synthesis suggested can serve as a basis for a truly scientific spirituality in which scientific progress not only gradually unveils the mysteries of nature but also yields the tools to reach out to the Mystery of God Himself. One of the founders of quantum mechanics, Edwin Schrödinger, inquired which scientific achievements have best helped the religious outlook on the world. Heller answered as follows: "Personally, I think… that particular scientific achievements do not do this work best, but rather the scientific method itself."[54] This is precisely what the new synthesis of science and theology as exemplified by evolutionary theology is all about.

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54 M. Heller, *Science and Transcendence*, Studies in Science and Theology 4(1996), 3-12.

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WHY METAPHYSICS MATTERS FOR THE SCIENCE-THEOLOGY DEBATE – AN INCARNATIONAL CASE STUDY

Abstract. This article examines the relationship between science and theology within a critical realist framework. Focusing on the role of metaphysics as a unifying starting point, especially in consideration of theological issues that are concerned with corporeality and temporality (such as in the incarnation). Some metaphysical challenges that lead to the appearance of "paradox" in the incarnation are highlighted, and the implications of two forms of holistic scientific ontology on the appearance of a paradox in the incarnation are explored. It is concluded that ultimately both science and theology are concerned with the nature of reality, and the search for coherent models that can describe the unseen. Whilst one should maintain a criticality to any realist conception of theological and scientific theories, a shared metaphysics ensures theological doctrine can continue to be interpreted with relevance in a world in which scientific thought is increasingly stretching into the meta-scientific.

Keywords: critical realism; holism; incarnation; Christology; paradox

1. INTRODUCTION

If one accepts the premise that science and theology are both engaging with a reality that can be referred to, but which is beyond the range of a literal description, then one has to acknowledge the crucial role metaphysics plays in providing a foundation stone for an applied dialogue. This paper examines the potential impact of

scientific ontology[1] (as metaphysics) on our theological discussion of the nature of persons using the incarnation as a "case study". It can be argued that the paradox narrative of the incarnation is, in part, fuelled by metaphysical assumptions, and these assumptions may be challenged by an examination of the scientific ontology associated with contemporary physics. Classical physics seemed to force a choice between the adoption of (1) an "enchanted" cartesian ontology or (2) the acceptance of a scientific reductionist ontology. The ontological and theological issues raised by this apparent dichotomy have led to the claim that the incarnation is paradoxical[2] in a manner that challenges the logical consistency of Christian doctrine.[3]

2. OPENING COMMENTS AND THEORETICAL FRAMEWORK

There are perhaps as many definitions of metaphysics as there are metaphysicians. After cautioning against the assumption that *meta*physics relates to that which is "beyond" physics, in *Relation of Metaphysics and Theology* Tillich offers a clear definition that will

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1 Whilst it may be possible to argue that all of the natural sciences can be conceived of having their own implicit metaphysics. The focus of physics is into the nature of the natural world and its governing laws. This article focuses on the ontology (worldview/metaphysics depending on one's preferred terminology) associated with physics.

2 There is a related issue associated with the conflation of paradox and mystery; however, to examine this would go too far beyond the scope of this paper. For this discussion it is enough to note that a paradox arises when two components are held in tension that only appears to be able to be resolved by prioritising one side of the dichotomy over the other; whereas mystery is best understood as "those concepts that are not (and may never be) open totally to human explanation" (see D. Basinger, *Biblical Paradox: Does Revelation Challenge Logic?*, Bulletin of the Evangelical Theological Society 30(1987)2, 205-213). Therefore, it is possible to challenge the claim of paradox without asserting the removal of theological mystery or the epistemic distance between ourselves and God.

3 See Anderson for a detailed discussion of the challenge of logical paradox for Christian belief, cf. J. Anderson, *Paradox in Christian Theology: An Analysis of Its Presence, Character, and Epistemic Status*, (Series: Paternoster Theological Monographs), Paternoster, Milton Keynes 2007.

provide the starting point for this paper: "metaphysics should be defined as the analysis of those elements of the encountered reality which make experience universally possible. Metaphysics then is the rational enquiry into the structure of being, its polarities and categories as they appear in man's [*sic*] encounter with reality."[4] When this is viewed alongside the challenge to reductionism that complex physical systems cannot be *exhaustively* explained by their component parts,[5] and the difficulty of describing the world in either/or dichotomies (rather than both/and), I side with Barbour in his exhortation that "we must seek *a unitary view of man* [*sic*] which admits *many-levelled complexity*."[6] For any such theological account to be taken seriously it must be seen, at the very least, to not stand in direct opposition to the current scientific account of the world. Furthermore, when discussing that which is unobservable both science and theology must take account of the inadequacies/challenges of reductionist interpretations and recognise the complex relationship between models (in science and theology) and the reality they describe.

The focus of this paper lies in highlighting the importance of a coherent account of metaphysics to creating a meaningful dialogue between science and religion. However, as it is written from within a critical realist framework which informs the approach to the role of metaphysics it is necessary to first include a brief note on the assumptions that are made.

Losch argues that it is Barbour's *Issues in Science and Religion* that brought critical realism into the science and religion (or at least science-Christianity) debate, where it has since been taken up by others such as John Polkinghorne, Arthur Peacocke, and Alister McGrath. Perhaps the name most unanimously associated with

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4 P. Tillich, *Relation of Metaphysics and Theology*, The Review of Metaphysics 10(1956)1, 57.

5 I.G. Barbour, *Issues in Science and Religion*, Harper Collins, London 1971, 6-7.

6 Ibid., (emphasis in original).

critical realism is that of Roy Bhaskar (although it was only later that he adopted the expression "critical realism" over "transcendental realism" and "critical naturalism"). However, in relation to the science-religion discussion, and despite recent efforts to relate the two, "Bhaskar's critical realism and the critical realism of the science and theology debate… arrived at the term on independent routes."[7] What then is meant by critical realism and how might it relate to the science-religion debate?

Barbour introduces critical realism through his discussion of the scientific method – which presupposes a correspondence between the structure of the world, the data and the corresponding theories. This assumption of realism and "interest in unifying the concepts of the separate sciences, seem to presuppose… some reference to a world under investigation"[8] (i.e. a correspondence theory of truth, associated with realism). However, this realism needs to be qualified or "critical". "Critical realism" in this sense recognises that whilst the intent of a scientific description of the world is realist, our language and models of the world offer only an indirect account as "no theory is an exact description of the world, *and* that the world is such as to bear interpretation in some ways and not in others."[9] In this understanding there is nothing more challenging espoused in critical realism than the recognition of the limitations of our language and knowledge, as well as the roles of creativity and imagination in the construction of our scientific theories about the nature of the world (scientific ontology). As it is used in this article therefore, critical realism requires the scientist, philosopher or theologian to recognise that reality is always mediated through our experience of it, and that there are aspects of reality that cannot be fully known in and of themselves (thus falling short of a Kantian position, but not

7 A. Losch, *On the Origins of Critical Realism*, Theology and Science 7(2009)1, 96.

8 I.G. Barbour, *Issues in Science and Religion*, op. cit., 172.

9 Ibid., 171, (emphasis in original).

reverting to a naïve realism). To return to Barbour: "Yes, science is trying to describe reality, but it does so only very indirectly in highly symbolic and abstractive language. One has to use models, but one has to recognize their limitations, one has to realize that they are partial and limited… that none corresponds exactly in a simple way to reality."[10]

Alongside this understanding of critical realism in relation to religion and science, Bhaskar's account provides a helpful model for conceptualising how science and religion may be understood in a productive relationship, in so far as it states that whilst "there is (or can be) an essential unity between the natural and the social sciences"[11] there are also "significant differences in these methods, grounded in real difference in their subject matters."[12] This may not seem to be particularly supportive to understanding the unity between science and religion, however as McGrath notes in *The Territories of Human Reason* what this in fact means is that the world can be understood as existing in strata: individual disciplines inform our thinking about each stratum, but unlike a reductionist account these are not to be set up in a hierarchy. Rather "each stratum of reality – whether physical, biological or social – is to be seen as 'real' and capable of investigation using means appropriate to its distinctive reality."[13] This echoes Torrance in *Theological Science*, where he argues "the theologian and the scientist are at work not only in the same room, so to speak, but often at the same bench, yet in such a way that each acknowledges the distinctive nature of the other's subject-matter."[14]

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10 I.G. Barbour, *Commentary on Theological Resources from the Physical Sciences*, Zygon 1(1966)1, 30.

11 R. Bhaskar, *The Possibility of Naturalism: A Philosophical Critique of the Contemporary Human Science*, Harvester Wheatsheaf, New York 19892, 2.

12 Ibid., 3.

13 A.E. McGrath, *The Territories of Human Reason: Science and Theology in an Age of Multiple Rationalities*, OUP Oxford, New York 2019, 69.

14 T.F. Torrance, *Theological Science*, Vol. 1, Clark, Edinburgh 1996, xii.

What does this mean for the possibility of a critical realist framework of the science-theology debate? It necessitates a recognition of a quasi-integration model (in relation to Barbour's four-fold typology),[15] held with Bhaskar's recognition of a stratified ontology, where different methods are appropriate to the investigation of different aspects of our world (but they are needed in unity, rather than either/or in order to give a full picture of the world and our place in it). In summary, as understood in this article a critical realist framework adopts the following assumptions:

1. Natural science aims to describe the nature of the world, using symbolic and abstract language (that may require interpretation);
2. Christian theology aims to account for the nature of a triune God, including the nature of the second person as an incarnate being, using symbolic and abstract language (that may require interpretation);
3. Critical realism recognises the distinctive contribution each makes to our understanding of the world;
4. When providing an account of the nature of God's interaction with the world (especially in relation to the incarnation) it is necessary to take into account the knowledge and ontological (metaphysical) framework(s) provided by the natural sciences.

The use of critical realism in science and theology is not without its critics. Particularly notable is Nancey Murphy's argument that "critical realism is a problematic philosophical doctrine that unnecessarily complicates attempts to relate theology and science."[16] Whilst recognising that Bhaskar's account of transcendental realism (and later critical realism) is philosophically loaded, this was not the use of critical realism that Barbour, or Polkinghorne had in mind.

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15 I.G. Barbour, *Religion in an Age of Science*, SCM Press, London 1990, chapter 1.

16 N.C. Murphy, F*rom Critical Realism to a Methodological Approach: Response to Robbins, Van Huyssteen, and Hefner*, Zygon 23(1988)3, 287.

For both scholars, the notion of critical realism is set in contrast with a naive "scientific realism" and is intended to highlight the roles of uncertainty, the unseen, and models in scientific progress. I don't believe that such an account of critical realism is philosophically problematic, but rather highlights a recognition of the limits of our ontology, and that theological accounts of the nature of persons and reality should at the very least not dismiss the realism of scientific ontology.[17] Thus, to quote Torrance: "each seeks to establish the same kind of relation with the real…, they cannot but interact with one another and learn from one another, if only in learning how to be religiously faithful to the nature of reality into which they inquire and so be real in their thinking."[18]

A final note on terminology. Scientific ontology is taken to mean a natural scientific account of what exists and what these things are like – this work focuses on scientific ontology in relation to contemporary physics. This implicitly includes questions about reductionism in particular: whether reductionism is simply a useful method that enabled scientific progress and explanation, or if reductionism is understood to relate to fundamental ontology (i.e. that all higher properties can be fully explained by the properties of the constituent parts, and that "emergence" of new properties are the result of new or unexpected relationships between the parts). Yet it is important to note that "there is often significant underdetermination of ontology by the sciences",[19] i.e. the accounts are open to multiple (contrary)

17 The extent to which our understanding of the mundane world can (and should) inform our thinking about the nature of the divine is an extensive debate that goes far beyond the scope of this article. However, at the very least (as I shall argue) with respect to the incarnation, where God is embodied and temporally limited on earth, our understanding of the nature of that world should not be diametrically opposed to our theological account of the nature of Christ.

18 T.F. Torrance, *Theological Science*, op. cit., xiii.

19 A. Chakravartty, *Scientific Ontology*, Oxford University Press 2020, 5.

ontological interpretations.[20] Given the progress of modern science and the continued strength of its explanatory power, the dominant (folk) narrative of materialist reductionism appears to stand in stark juxtaposition to the theological account that requires the existence of some form of immaterial entities.[21] Because of the apparent disjunction between the scientific and the theological accounts of ontology it can seem that one is faced with a stark contrast – maintain that we live in an "enchanted world", that "is the world of spirits, demons and moral forces which our ancestors lived in"[22] (which may be the only way to allow for a Cartesian or similar ontology with room for the immaterial). The alternative is to accept the reductionist ontology of common science that leaves no room for non-material entities (whether divine beings or souls). The premise of this article is that this perceived dichotomy is false and that there is a third way. The above dichotomy (dualism vs. reductionism) rests on a refusal to acknowledge the fact that "more than eight decades after the downfall of classical physics, the idea that the physicalist conception of nature, based on the invalidated theory classical physical theory, might be profoundly wrong in way highly relevant"[23] to the current discussion. If both science and theology are seeking to describe the same objective reality with similar limitations concerning language and that which is unseen (a critical realist view), and one holds that the second person of the Trinity was genuinely and meaningfully incarnate on Earth (within time and space and with corporeality), then there is a marked

20 This is particularly true concerning the ontology associated with quantum theory. Here there is an empirical way to test between the different ontological descriptions.

21 This is without considering mounting weight of contemporary philosophical accounts against materialism, such as the rich scholarship found in *The Waning of Materialism*, eds. R.C. Koons, G. Bealer, Oxford University Press, New York 2010.

22 Ch. Taylor, *A Secular Age*, Harvard University Press, Cambridge 2007, 26.

23 H.P. Stapp, *Quantum Reality and Mind*, in: *Quantum Physics of Consciousness*, eds. S. Kak, R. Penrose, S. Hameroff, Cosmology Science Publishers, Cambridge 2011, 341.

overlap in enquiry when it comes to understanding the "structure of being".

In what follows I will briefly expand on the place of metaphysics (as ontology) in both theology (in relation to the incarnation) and contemporary physics, before discussing some of the metaphysical challenges associated with a Chalcedon account of the incarnation. This discussion of the incarnation provides a "case study" for the final section that examines how, within this critical realist framework, metaphysics provides a crucial dialogic foundation for the science-theology relationship.

3. THE PLACE OF METAPHYSICS IN THEOLOGY AND CONTEMPORARY PHYSICS

Metaphysics and theology have often been associated through a (potentially) problematic assumption that *meta*physics refers to that which is above/beyond physics (courtesy of Aristotle). Tillich argues that the connotation of metaphysics as that which is beyond the physical was compounded by the "»supranatural« which designated the realm of divine above nature."[24] However, when understood as a rational investigation into the nature of being (or an account of ontology that also includes "structures of less universality like nature, man [sic], history"[25]) it seems neither unsurprising nor problematic that metaphysics has an important role to play in our theological conversation. When one moves beyond the task of theology more generally, to consider the Christian doctrine of the incarnation it becomes even more clear how questions of persistence, constitution, and mind-body (amongst others) should come to the fore in light of the 20th century "resurgence in realism… [and how] realist inquiry… might inform our understanding of this most central of Christian

24 P. Tillich, *Relation of Metaphysics and Theology*, op. cit., 57.
25 Ibid., 58.

beliefs."[26] As Cross notes in *The Metaphysics of the Incarnation*, "as soon as we adopt any sort of realist stance (whether moderate or extreme) on the status of the sorts of entity that we presuppose in our ordinary language we are likely to want to talk about an ontological content to the Chalcedonian formula."[27] He goes on to say that such ontological grounding will be driven partly by a philosophical analysis of reality and partly by theological concerns to "remain faithful to the basic Chalcedonian claim"[28] regarding Christ's humanity and divinity.

The role of metaphysics in scientific enquiry may appear less obvious on initial inspection. However, the foundation role of metaphysics in the scientific enterprise is highlighted by scholars such as M. Leidenhag when he states that "scientific realism seems more like a metaphysical presupposition than a derivable truth… we have no naturalistic reason for adopting a realist interpretation of scientific theories."[29] Whilst providing a slightly different perspective on whether scientific practice is predicated on metaphysical assumptions or vice versa, Maudlin writes extensively on the interaction, for example in his exhortation that: "Physical theories provide us with the best handle we have on what there is… In particular, when choosing the fundamental posits of one's ontology, one must look to scientific practice rather than to philosophical prejudice."[30]

Even though Chakravartty argues against a unified or distinct "scientific ontology", he does describe "scientific ontology as inherently *meta*-scientific. That is, it involves criteria for ontological commitment that are not themselves constitutive… of the relevant scientific

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26 R. Le Poidevin, *Incarnation: Metaphysical Issues*, Philosophy Compass 4(2009)4, 703.

27 R. Cross, *The Metaphysics of the Incarnation: Thomas Aquinas to Duns Scotus*, Oxford University Press, New York 2002, 3.

28 Ibid.

29 M. Leidenhag, *Emergence, Realism and the Good Life*, in: *Issues in Science and Theology: What Is Life?*, eds. D. Evers *et al.*, Springer, Cham – Heidelberg – New York – Dordrecht – London 2015, 95.

30 T. Maudlin, *The Metaphysics within Physics*, Oxford University Press, Oxford 2009, 1.

practice."[31] In other words, the diverse scientific ontologies that may inform our thinking about and understanding of the fundamental nature of the world are themselves based in commitment to different philosophical positions.[32] Therefore, just as our response to the claim that there is a theological paradox in the person of Christ is going to be informed by our philosophical and ontological commitments, when this is being examined at the boundary of scientific understanding and theology, it is necessary to recognise that the scientific worldview is itself framed through a variety of ontological positions. Both the scientific ontology and the (theological) metaphysical assumptions regarding persistence, personhood etc, need to be understood and interrogated.

It is interesting therefore that, in exhorting us to understand the influence of worldviews (ontology) on our understanding of Biblical texts, Nürnberger assumes a single or more "reliable" ontology can gained through science: "We must do for our times what the biblical authors did for theirs. Although the Israelite set of assumptions was pre-scientific, it is based on interpreted experience, rather than metaphysical speculation. As such it is more amenable to being updated, enriched, and empowered by modern science that a doctrinal theology based in Hellenistic metaphysics."[33]

Thus, whether a certain metaphysical approach is taken as a presupposition to scientific enquiry, or one simply wants to recognise the relationship scientific theories can/should have to our ontological commitments, it is necessary to recognise that just as the Incarnation raises a range of metaphysical issues, "debates in contemporary

31 A. Chakravartty, *Scientific Ontology*, op. cit., 6-7.

32 Ibid., 31.

33 K. Nurnberger, D*ust of the Ground and Breath of Life (Gen2:7): The Notion of "life" in Ancient Israel and Emergence Theory*, in: *Issues in Science and Theology: What Is Life?*, op. cit., 102.

metaphysics are likely to have a bearing on our understanding"[34] of the incarnation.

Further understanding the debates regarding realism (critical or not) and ontology in both metaphysics and science has the potential to navigate and/or respond to contradictions and paradoxes that seem bound with a realist view of the incarnation.[35] Therefore, it is the metaphysics (or ontology, or scientific theory) that provides the foundation to a constructive relationship between science and religion.

Next, I shall outline some of the metaphysical issues (that have often been classed as paradox) associated with the incarnation. The aim is not to provide an exhaustive account of the issues (or solutions), but instead offer some key examples of where the appearance of a contradiction rests in metaphysics. After examining these issues, the final section of this paper will examine how the future direction of these discussions can become more profitable through recognising the implications of the scientific shift away from Newtonian metaphysics.

4. METAPHYSICAL PARADOX IN THEOLOGY

"To say that Christ is a single hypostasis who joins together two wholly distinct and unequal natures – the transcendent, infinite, foundational reality of God and the limited reality of a historical human being – in a »mode of union« which constitutes his present personal reality is to say that he is a living paradox."[36] Whilst paradox and mystery are often used interchangeably, in fact they point to very different theological challenges – mystery can be best understood

34 R. Le Poidevin, *Incarnation: Metaphysical Issues*, op. cit., 712.

35 Ibid.

36 B.E. Daley, *Nature and the "Mode of Union": Late Patristic Models for the Personal Unity of Christ*, in: *The Incarnation: An Interdisciplinary Symposium on the Incarnation of the Son of God*, eds. S.T. Davis, D. Kendall, G. O'Collins, Oxford University Press, Oxford 2004, 194-195.

as "those concepts that are not (and may never be) open totally to human explanation."[37] Whereas paradox points to something that is (or appears to be) contradictory. In other words, there is a tension implicit in paradox that is not found within mystery. It could be argued that the paradox of Christ is caused by the limitations of our language and thus there is only an appearance of contradiction due to our own limitations.

Can a "living paradox" be resolved through an examination of logic? In *Biblical Paradox: Does Revelation Challenge Logic?* David Basinger examines whether the biblical revelation asks/requires us to hold in tension truths that are incompatible from a human perspective. However, whilst offering a clear account of some of the differences between paradox, mystery and contradiction, he doesn't actually address the question of how one can deal with a paradoxical person, only how one should deal with self-contradictory "truths" within the bible. However, if we are to take paradox to refer to things that appear to be (self-) contradictory or exist in a state of irreconcilable tension, it should be clear how such terminology can come to be "appropriately" used to describe the person of Christ. Afterall what could be more contradictory than an eternal, transcendent God becoming embodied in a spatially and temporally limited human body?

The same is true of both the early work of Vernon C. Grounds in *The Postulate of Paradox*[38] and the contemporary work of James Anderson in *Paradox in Christian Theology*, in which paradox is seen as a logical contradiction that runs the risk of making Christian theology appear irrational and therefore a challenge to its rigour and relevance. Baugus takes an alternative approach in *Paradox and Mystery in Theology*,[39] arguing that whilst the paradox in theology

37 D. Basinger, *Biblical Paradox: Does Revelation Challenge Logic?*, op. cit., 105.

38 V.C. Grounds, *The Postulate of Paradox*, Bulletin of the Evangelical Theological Society 7(1964), 3-21.

39 B.P. Baugus, *Paradox and Mystery in Theology*, The Heythrop Journal 54(2013)2, 238-251.

involves contradiction, this does not necessitate a logical paradox, but rather a need to recognise the limitations of our finite (and fallen) knowledge. Yet, this still involves an assumed priority of epistemology in reconciling the tension. Whilst agreeing that these issues are important at the level of epistemology and linguistics, there is a more productive conversation to be had on the "living paradox" when it is examined in terms of metaphysics.

The influence of ontology/metaphysics on the development of theology can clearly be seen above and this leads into the questions of the role of scientific ontology in our theological discussion. John W Cooper[40] presents a clear, albeit brief, account of the development of a scientific-informed Christology. "Reversing the historic order of revelation and reason, [naturalist theologians] engaged in biblical interpretation and theological construction within the framework of the philosophy and science that developed after Galileo and Newton."[41]

Adoption of a theistic naturalism in relation to understanding the body and soul has arisen from attempts to synthesise theological and scientific worldviews. Non-dualistic alternatives (such as emergentism and psychophysical monism) have been developed against the rise of a reductionist materialist (scientistic) stance to allow for genuine human agency and spirituality. Cooper highlights three key approaches to defending Christian concepts of the soul and free will:

1. Historic Christian dualism (-in-unity);
2. Modern theistic naturalist monism;
3. Historic Christian monism.

These three approaches model different responses to the interpretation of the Chalcedon definition on the grounds of their underlying ontology. The historic dualistic position supports the

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40 J.W. Cooper, *Body, Soul, and Life Everlasting: Biblical Anthropology and the Monism--Dualism Debate*, Eerdmans, Grand Rapids 2000.

41 Ibid., 37.

Chalcedon definition as theological anthropology (understanding of persons) with respect to "the image of God, freedom of the will, and the two natures of Christ."[42] However, as with substance dualism outside theology the historic position gives raise to other issues in relation to causality, interaction and understanding the self as a unified individual. Theistic naturalism and monistic anthropological models are not the mainstream approach currently adopted by the church, and they can be understood as providing a far more reductionist understanding of the nature of humanity. However, supporters argue that they will gain increasing support as the dualist position appears to become ever more detached from the scientific understanding of reality: "as scientific research and education progress. They wish to show that the Christian faith is not tied to an outdated philosophy and science."[43] Under theistic naturalism the "two natures" of Christ and His death and resurrection are to be understood in a very different way. Without an immaterial soul the resurrection is either an "immediate resurrection followed by a series of appearances to his disciples, or… a temporary ethereal embodiment followed by resurrection"[44] and it is only the resurrection (if it indeed happened) that separates His divine and human natures. Finally, the historical monistic position offers and internally inconsistent understanding of the nature(s) of Christ. Due to the lack of a clear demonstration of monistic anthropology within scripture (or at the very least a clear defence that the Bible does not posit a dualist understanding of the person), Cooper argues that biblical monists "hold an anthropology which is at odds with their professed view of scripture and which sides with scientific naturalism."[45] The monistic position appears to require the Christian who adopts it to also bring into question an orthodox

42 Ibid., 39.
43 Ibid., 40.
44 Ibid.
45 Ibid., 41.

interpretation of Chalcedon. This challenge is succinctly captured by Goetz: "God an immaterial being, resides in and causally acts upon a human with a material body… to reject interactionist substance dualism because the concept of causal interaction of an immaterial soul on a material body faces insurmountable philosophical and scientific objections, then one would be even more hard pressed not to reject the idea of the incarnation itself for the same reason or reasons."[46]

Therefore, the rise of scientific naturalism can also be understood as a move away from the "unscientific" concept of substance dualism. In the years since Descartes and with the (apparently) increasing materialistic understanding of the nature of the world, Christology, and the ability of an immaterial divine person to be causally and meaningfully engaged with the "physical" world, has led to theology appearing to be evermore out of step with our "disenchanted" understanding of the world. However, an increasing number of scholars are questioning such strictly materialist stances (whether through supporting emergent theories of the mind or more radical holistic approaches to the nature of reality) to protect an orthodox understanding of Chalcedon.

The challenge of defending an orthodox interpretation of Chalcedon means that Christian theology must engage in a meaningful way with questions of metaphysics and ontology and as such ensure that it does not limit itself to simply dealing "only or even primarily with manifestations and functions."[47] If it fails to engage with questions of ontology, it also fails to ensure that it is tackling the correspondence between our expression (of faith or reality) and reality itself. Thus, the engagement of theology with scientific ontology becomes of

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46 S. Goetz, *Substance Dualism*, in: *The Ashgate Research Companion to Theological Anthropology*, eds. J.R. Farris, Ch. Taliaferro, Ashgate, Burlington 2015, 135.

47 Y. Woodfin, *Ontological Thresholds and Christological Method*, Religious Studies 8(1972)2, 137.

central importance in ensuring that "metaphysical issues and the believer's conviction regarding the nature of divine reality are at least analogically comparable."[48] Torrance argued that such an engagement with metaphysics was necessary to even pose questions, as without ontological congruence between reality and experience our discourse is meaningless.

As noted, it is in this space that both classical scientific ontology (the strict, deterministic, materialism of Newton) and contemporary scientific ontology (that includes the non-deterministic, and possible holism of quantum accounts) come to bare on our understanding of the nature of the Son incarnate. Before examining this further it is important to note that this discussion will deal explicitly with how the shift from Newtonian to Non-Newtonian metaphysics has the potential to change the appearance of the incarnational paradox – therefore it will address cases where Newtonian metaphysical assumptions have caused the appearance of a paradox (often naturalistic accounts), over other theological solutions to those cases.[49]

As noted by Stump, it is one thing to sate the Chalcedon definition of the incarnation – Christ is one person with two natures, fully human and fully divine, and quite another to explain what this means. "Aquinas relies heavily on his general metaphysical theory to provide on interpretation… his interpretation is so thoroughly rooted in his general metaphysics that it is not possible to grasp this part of his philosophical theology without some understanding of his metaphysics."[50]

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48 Ibid., 138.

49 The focus of this article lies in highlighting the role of metaphysics as a foundation to a productive science-theology dialogue, and whilst alternative theological solutions have been posed, these often revolve around creating solutions to a naturalistic or dualistic account and/or dismissing an issue rooted in ontology as a purely linguistic/epistemological issue, thus not tackling the "paradox" caused by the ontological assumptions.

50 E. Stump, *Aquinas' Metaphysics of the Incarnation*, in: *The Incarnation: An Interdisciplinary Symposium on the Incarnation of the Son of God*, op. cit., 197.

The rise of modern science and the Newtonian account of a deterministic, materialist world has often been cited as the point of movement towards Taylor's disenchanted ontology. However, as he notes whilst the folk account runs: "first science gave us »naturalistic« explanations of the worlds. And then people began to look for alternatives to God."[51] The "new" science wasn't necessarily a threat to God, but "it was to the enchanted universe and magic."[52] As such what Newtonian metaphysics challenged was an account of the world in which immaterial entities had a role or space within our ontology and in doing so the incarnation asked us to consider how something "relevantly like a soul become something relevantly like a stone."[53] However, in a world where it may be argued that strict materialism is under threat,[54] one must consider whether it is necessary to revisit the assumption that the incarnation is "paradoxical" at the level of metaphysics. I have previously discussed the challenges of a classical reductionist account to our understanding of the incarnation, and therefore will not repeat the arguments here.[55] It is enough to note at this stage that the challenge rests in developing a coherent account of natures (and/or substances) that can explain the relationship between complex wholes and their constituent parts. Whether or not one adopts a reductionist approach to metaphysics, the "complex whole"

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51 Ch. Taylor, *A Secular Age*, op. cit., 26.

52 Ibid.

53 B. Leftow, *The Humanity of God*, in: *The Metaphysics of the Incarnation*, eds. A. Marmodoro, J. Hill, Oxford University Press, Oxford 2011, 21.

54 See for example the edited volume by Koons and Bealer.

55 F. Lawson, *'He Who Descended Is Himself Also He Who Ascended' – Exploring the Identity of the Son of God in Light of Quantum Holism*, in: *Forty Years of Science and Religion*, eds. N. Spurway, L. Hickman, Cambridge Scholars Publishing 2016, 179-186; F. Lawson, *'Complete in Manhood' – Understanding Christ's Humanity in Light of Quantum Holism*, in: *Studies in Science and Theology: Yearbook of the European Society for the Study of Science and Theology*, eds. D. Evers *et. al.*, Martin Luther University Halle-Wittenberg 2018, xvi, 127-142; F. Lawson, *'Not Three Gods but One' – Why Reductionism Doesn't Serve Our Theological Discourse*, Athens Journal of Humanities and Arts 6(2019)1, 85-106.

of the Incarnate Son requires a clear account of "the foundational or fundamental entities of reality"[56] if one is to avoid claiming "mystery" as an intellectual fig leaf to protect from intellectual embarrassment.

It is this question of "substance" that lies at the heart of claims that the incarnation is paradoxical (at a metaphysical level). The issues raised by a dualistic account of the incarnation (or personhood in general) are well documented and have not changed significantly since Descartes' initial detractors. Fundamentally, the objection rests on the fact that the soul is conceived as an immaterial substance "that has mental properties but no physical properties"[57] and the union between body and soul is (significantly) constituted by the soul's ability to control bodily actions. These issues are normally considered commensurate between mortal souls and their bodies and the union of divine and human in Christ. The familiar objection to this understanding of personhood rests in the challenge that, if the body and soul are fundamentally distinct and different substances, how are they to interact when our classical scientific metaphysics states that only physical objects can cause physical objects to move (although it would seem pertinent to add a caveat that only physical objects, or the forces associated with the interaction between physical objects can cause a physical object to move).[58] This criticism does not bear the same weight within the theistic (and to an extent deistic) theological discussion of causation and/or divine action in the world. This is because, particularly in the context of Christianity, it is necessary for an immaterial (however that is understood) God to be

56 H. Robinson, *Substance*, in: *The Stanford Encyclopedia of Philosophy*, ed. E.N. Zalta, Spring 2020 (https://plato.stanford.edu/archives/spr2020/entries/substance/), [accessed 09/2020].

57 T. Merricks, *The Word Made Flesh: Dualism, Physicalism, and the Incarnation*, in: *Persons: Human and Divine*, eds. P. van Inwagen, D. Zimmerman, Oxford University Press, New York 2007, 282.

58 This relates to Dodds' examination of the move away from understanding God's causality univocally as only being able to act as a divine force. See M.J. Dodds, *Science, Causality, and God: Divine Action and Thomas Aquinas*, Angelicum 91(2014)1, 13-36.

able to causally influence the physical world. The incarnation therefore provides "a decisive reason to reject the premise that the physical and the non-physical cannot causally interact."[59] However, whilst theology may allow a compelling reason this does not counteract the challenge that dualistic metaphysics still appears to place Christianity at odds with current scientific accounts of the world.

5. HOLISTIC ONTOLOGY AND THE "PARADOX" OF CHRIST

In adopting a realist interpretation of Chalcedon, the fundamental metaphysical question raised is how Christ's humanity and divinity can be joined coherently within a single person and without falling afoul of the many and varied heretical "solutions". At the outset I stated that answers may lie in contemporary scientific ontologies, and that the metaphysics inherent in such accounts may provide a fruitful point of engagement for theology and science. In the foregoing section I have noted some of the issues associated with trying to bring the incarnation in line with scientific thinking, including the challenge of maintaining relevance and theological coherence in light of the move away from dualism, and the central role of "substance" in incarnational accounts. This section will highlight how a holistic scientific ontology may provide an account that preserves the spirit of Chalcedon in a meaningful and orthodox way, whilst removing the appearance of a paradox and maintaining coherence with current scientific ontologies.

As noted above, if the question of "substance" lies at the heart of our understanding of the incarnation then we must consider what we mean by substance and the kinds of substance(s) that exist – ergo, the questions at the very heart of metaphysics. Likewise, the common understanding of the scientific account of the world is that it proceeds by reductionism, which is not simply a convenient method,

59 T. Merricks, *The Word Made Flesh*, op. cit., 284.

but an accurate way to understand the nature of the world and its constituent parts. In many senses this also encapsulates a common approach to understanding the incarnation – there is a tendency to examine the constituent parts of the Son (as divine) and Jesus (as human) to understand and negate the conflict between the two natures. For example, the kenotic approach "empties" the Son of the divine characteristics that are incompatible with human personhood.

An implicit assumption within incarnational theology, that is rarely articulated, is that Christ (as fully human and fully divine) is more than each of those parts understood individually – that the incarnate Son is more than its constituent parts in a meaningful way, which allows the two natures to cohere. If one acknowledges, that it is not possible for (some) complex entities to be fully explained through an account of their physical parts and the relationships between them (the starting point for both Maudlin[60] and Esfeld's[61] accounts of quantum holism) this metaphysical foundation provides a rich opportunity to re-interpret and re-conceptualise our understanding of theology and science.[62] In what follows I will provide two brief examples of how different scientific ontologies (both based in holistic understandings of quantum theory) challenge the classical interpretation of the incarnation. The accounts differ in whether they maintain the existence of fundamental "parts" within holism.

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60 T. Maudlin, *Part and Whole in Quantum Mechanics*, in: *Interpreting Bodies: Classical and Quantum Objects in Modern Physics*, ed. E. Castellani, Princeton University Press, Princeton 1998, 46-60.

61 M. Esfeld, *Philosophical Holism*, in: *UNESCO Encyclopedia of Life Support System*, Social Sciences and Humanities, 2013, (http://www.unil.ch/files/live//sites/philo/files/shared/EOLSS-PhilHolism03.pdf), [accessed 10/2015]; M. Esfeld, *Holism in Philosophy of Mind and Philosophy of Physics*, (Series: Synthese Library, Vol. 298), Kluwer Academic Publishers, Dordrecht – Boston 2001.

62 It is important to note that this is not to claim that science, or its methods, should fully drive our theological doctrine. Rather, where doctrine deals with matters of divine interaction with the world a joint metaphysics provides a strong foundation for interaction between the two.

Metaphysical holism states that "in the last analysis, there is only one independent thing. Everything that exists is a way of being that thing",[63] when this is combined with the popular definition that a holistic object is "more than the sum of its parts". A claim of holism is, in fact, the conjunction of two claims: "(a) that a whole in the sense of a holistic system has parts and that (b) what turns a whole into a holistic system is that it is more than the sum of its parts."[64]

Firstly, Primas examines the very holistic "system" itself, that is, how we are to understand objects that appear to be composed of many different parts. In *Non-Boolean Descriptions for Mind-Matter Problems*, Primas sets out a "framework for the mind-matter problem in a holistic universe which has no parts."[65] He claims our current understanding of mind-matter is based on a tacit acceptance of classical atomism and this assumption of the correctness of a reductionist model of reality has serious knock-on implications. Primas bases his need for Non-Boolean descriptions in the fact that quantum mechanics has shown atomism to be incorrect, thus causing reductionism to fail. Therefore, instead of being the fundamental building blocks of reality, "elementary particles" should in fact be more correctly understood as secondary manifestations or '*patterns*'[66] in reality. These patterns are to be understood as arising from our contextually based decomposition of the "fundamentally holistic universe of discourse", when we "isolate a phenomenon and assign individuality to it"[67] (creation of a pattern) and not from an underlying ontological atomism. It is this underlying holism that means "quantum mechanics is the paradigmatic example

63 M. Esfeld, Philosophical Holism, in: *Unity of Knowledge (in Transdisciplinary Research for Sustainability), Vol. 1*, ed. G. Hirsch Hardon, Eolss Publishers, Oxford 2009, 120.

64 Ibid., 10, sec. 5.1.

65 H. Primas, *Non-Boolean Descriptions for Mind-Matter Problems*, Mind and Matter 5(2007)1, 7.

66 Ibid., 8.

67 Ibid., 11-12.

of a theory which allows the description of a whole which does not consist of parts."[68]

Primas' account of reality argues against descriptions of the world resting in duality, instead arguing that we should describe the world in terms of complementarity. When understood in terms of duality divine and human (or material and immaterial) fall in to two discrete categories, where an entity is either one or the other. Complementarity allows for descriptions of the world without "well defined" attributes. To say that the statement is complementary rather than dualistic is to claim that it describes a holistic situation "where Boolean fragmentation into parts is not possible."[69] Complementarity allows us to describe a world in which Boolean classification does not work, at the ontological level. In the case of the incarnation this means that material and immaterial should not be placed as opposed categories, but instead understood as distinctions we have made due to our own epistemic limitations. If something that is relevantly "soul-like" is not made of a different substance to something relevantly "stone-like" then the incarnation does not require the transformation of substance.

Primas' account protects against the challenge of meaningfully joining different substances within Christ. If the differences between material and immaterial are only matters of our convenience rather than ontology, then one is able to avoid the challenges of both materialist and dualistic accounts of the incarnation. However, perhaps one of the biggest problems that remains is not new – if we are dealing with a fundamentally monistic world then how are we to distinguish between God and the world, the human and divine (whether or not in Christ); and if this is not possible, do we then need to again re-imagine our theology to account for pan(en)theism?

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68 Ibid., 8.
69 Ibid., 15.

In contrast, whilst Michael Esfeld allows parts within Holism he argues against an (atomistic) account of a metaphysics of individuals. A difficulty with both reductionism and naturalism is that they assume an underlying metaphysics of individuals, characterised by their individual properties. It is these independent individuals embedded in space-time that we study in the physical sciences and it is the relationship between two individuals that that we are asked to consider in the incarnation, even if one of them appears to be embedded in space-time at most temporarily. According to the majority view of a metaphysics of individuals, we know these embedded objects are individuals because (1) they are located in space-time, (2) properties can be attributed to them and (3) their qualitative properties can be used to distinguish them from other individuals.[70] When it comes to understanding the incarnate God on the basis of these properties it is easy to understand how the person of Jesus of Nazareth can be seen to exemplify all three, and indeed the same could be said for the embodied Son of God. However, the big issue this raises for the Son of God is how, as an individual, we are to relate His incarnate self with His pre-existent and post-ascension "selves".

Within a metaphysics of individuals, some of an individual's qualitative properties can be understood as basic or intrinsic properties, meaning that they are fundamental to that individual and unable to be reduced to other properties. An individual has intrinsic properties irrespective of the existence of other contingent beings, whereas "all other qualitative properties are extrinsic or relational"; thus, they are "independent of accompaniment or loneliness."[71] One of the reasons for arriving at a metaphysics of individuals (even if properties are fundamentally relational) rests in the fact that it would

70 This includes, at the very least, its location in space-time.

71 M. Esfeld, *Quantum Entanglement and a Metaphysics of Relations*, Studies in History and Philosophy of Science, Part B: Studies in History and Philosophy of Modern Physics 35(2004)4, 602.

seem that the relations require there to be things that are standing in those relations. In other words, it is necessary for there to be objects whose intrinsic properties are not relational (or least are not fundamentally relational). However, it is possible to argue that whilst relations require something to be standing in that relation, it is not necessary for those things to be something in and of themselves – they "do not have any intrinsic properties that underlie the relations in which they stand."[72]

Thus, there is a gap between our metaphysical theory (of individual things with intrinsic properties) and the apparent limitation that our fundamental physical theories provide only information regarding the relationships that physical things stand in. Faced with this gap between epistemology and metaphysics we have two options: (1) maintain a belief in a metaphysics of individuals, even if to accept this means we are unable to gain knowledge about the intrinsic properties of the individuals in so far as they are intrinsic; or (2) discard a metaphysics of individuals in favour of a metaphysics of relations according to which at the fundamental level only relations exist. "There is no a priori argument that excludes a metaphysics of relations."[73]

Esfeld's relational approach opens space for immanence at the most fundamental level of nature. This is not to posit a God of the epistemological gap. Rather, if nature is more holistic than classical physics appears to allow we seem to arrive at a metaphysical foundation where our theological account of the world sits within (rather than being opposed to) a scientific understanding of the world. This may not provide greater clarity on the "how" of the incarnation (there is still a theological mystery), yet our theological and scientific conceptual frameworks are more closely aligned through a joint metaphysics.

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72 Ibid.
73 Ibid.

For both accounts once we have stripped away the qualitative properties, and we have no access to intrinsic properties even if they were to exist, the question then becomes how do we distinguish between the divine and human? Does it come down to a matter of degree? Epistemic freedom? Contingency? The shared metaphysics removes some of the challenges associated with dualist and strictly materialist accounts of the incarnation. However, whilst holistic metaphysics provides "solutions" to these issues it also brings to bear new challenges.[74] There is much more that could be said in relation to the incarnation, but within this article the purpose of this discussion is solely to highlight the paradigm shift that can be caused in our understanding of theological issues by a critical re-evaluation of our metaphysical assumptions. Furthermore, due to the shared realms of enquiry, metaphysics provides a clear starting place for questions that sit at the boundary of science and theology (including those relating to personhood, whether divine or human).[75]

6. METAPHYSICS AS A DIALOGIC FOUNDATION FOR THE SCIENCE-THEOLOGY RELATIONSHIP

This article does not offer an exhaustive account of the theological responses to the "living paradox" of Christ. Nor does it provide a full account of the impact of differing scientific ontologies on theological issues such as the incarnation. However, my hope is that the discussion has highlighted the role of ontology more generally, and metaphysics particularly, in both scientific and theological accounts of the nature of reality. Given the diversity of possible scientific

74 See F. Lawson, *'Not Three Gods but One' – Why Reductionism Doesn't Serve Our Theological Discourse*, op. cit., for further discussion.

75 For an example of the practical implications for human personhood see F. Lawson, *Denying the Binary: A Non-Boolean Approach to Queer Bodies in Theology*, in: *Reforming Practical Theology. The Politics of Body and Space*, (International Academy of Practical Theology Conference Series), Index Theologicus, Tübingen 2019), i, 45-52.

ontologies and the special case of the incarnation, it may be all too tempting to hide behind mystery and say that there is nothing to be offered by the naturalistic metaphysics of science. However, even if one disagrees with my assertion that there is much opportunity to be found in further examination of holistic ontology, metaphysics with its focus on constitution, identity, and the nature of what there is at a fundamental level, will inevitably influence the theological solutions one establishes. Whilst it is clear the metaphysics or ontology underpinning scientific theories is often implicit, it is all too easy to miss the influence that our metaphysical assumptions also have on one's approach to theological paradoxes and practical concerns. I stand with Maudlin's assertion that we are to begin with scientific practice (acknowledging the assumptions therein) and examine the implications these have for our theological understanding of the world (whichever ontology one choses), rather than constraining our metaphysics to fit our theological desire. In starting with metaphysics, one is able to provide a coherent account across the disciplines and this enables a clearer examination of whether the appearance of a paradox/conflict between our theological and scientific accounts of the world is based in our linguistic or epistemological limitations, our metaphysical assumptions, or involves a genuine contradiction.[76] Metaphysics seeks to explain the foundational entities of the universe, and as such it would seem a fitting foundation for the science-theology relationship where both sides are equally concerned with understanding the nature of "that which is, seen and unseen".

76 In some instances, the appearance of a paradox can be removed through further examination of knowledge/language/metaphysics that reveals the contradictions as mere limitations/assumptions on our part. In other instances, it may be discovered that we do not have the epistemic capacity to fully explain the objects/terms. Therefore, as we cannot know whether there is a genuine contradiction in these instances it is more correct to speak of mystery over paradox.

7. CONCLUSION

In this article the relationship between science and theology has been examined within a critical realist framework (by which little more is meant than the need to recognise the limitations of our models and language in describing reality). The focus has been on the role of metaphysics as a unifying starting point, especially in the consideration of theological issues that are concerned with people and events bounded by corporeality and temporality (such as in the incarnation). Some of the metaphysical challenges that lead to the appearance of a "paradox" in the incarnation were highlighted, and in turn I examined how a radical shift in metaphysics (based in the findings of contemporary physics) provides a very different perspective on the "paradox". The exploration of the impact of changing metaphysical assumptions on the incarnation provided a case study to highlight the importance of a shared foundation at the boundary of science and religion. Ultimately both science and theology are concerned with the nature of reality, and the search for coherent models that can describe the unseen. Whilst one should maintain a criticality to any realist conception of theological and scientific theories, a shared metaphysics ensures theological doctrine can continue to be interpreted with relevance in a world in which scientific thought is increasingly stretching into the meta-scientific.

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FRENCH ATHEIST SPIRITUALITY[1]

Abstract. The phrase "atheist spirituality" may seem rather paradoxical at first. In practice, both atheists and theists object to it. Atheists would prefer to be called naturalists – in order to emphasize their connection with a specific tradition and interpretation of the world, and avoid being equated only with the denial of theism. They will be willing to deny the existence of any spiritual element, and thus deny the meaningfulness of religious language. It is worth stressing that this does not apply to all atheists. A new form of spirituality suggested by Francophone philosophers concerns first of all the resignation from a faith about a transcendent God, which is substituted with an undefined sacrum (what is holy, is highest) in immanence. New forms of spirituality are becoming a popular alternative to religious spirituality today. However, traditional and new spiritualities should not be treated as separate sets, as they do not necessarily compete with each other. Systems of spiritual development related to specific denominations will always provide inspiration even for atheist spirituality. The latter can indicate that apart from religion, there is also a spirituality that can develop in a person. Nihilism is not the only alternative to religion, as sometimes the defenders of the old religious order try to show. Atheist spirituality can sometimes refer to realities that are rich and enhancing.

Keywords: spirituality; atheist spirituality; French atheist spirituality; transcendence in immanence; André Comte-Sponville; Luc Ferry; Alain de Botton

1. INTRODUCTION

Henri de Lubac in *The Drama of Atheist Humanism* writes that "it is not true that a person, as some seem to say, cannot arrange the

1 The article was prepared within the research project: *Francuska duchowość ateistyczna* [*French atheist spirituality*], Preludium – No. 2017/25/N/HS1/00353, financed by Narodowe Centrum Nauki (NCN) [National Science Centre, Poland].

earth without God. The truth is that without God they can only, in the end, arrange it against themselves. Humanism is excluded from inhumane humanism."[2] Similar thoughts can be found in the papal encyclicals of Paul VI *Populorum Progressio* and Benedict XVI *Caritas in veritate*. Paul VI writes: "A person can of course arrange earthly things without God, but by rejecting God, they can only direct them against people. Therefore, humanism, disconnected from all other things, certainly becomes inhumane."[3] Benedict XVI states in the same spirit: "Humanism which excludes God is inhumane humanism. Only humanism open to the Absolute can lead us in promoting and implementing forms of social and civic life."[4]

However, even a superficial understanding of society shows that these claims are false. Of all the people who do not believe in God, the greater part does not become inhumane. Since the Second Vatican Council's approach on religious freedom also undermines the above thesis, that the attitude "without God" leads to inhumanism, then the Church should never accept the possibility of not believing in God. Talking about religious freedom would become a useless formality.

It is true that atheism is becoming increasingly common in modern Western culture, due to, among other things, the fact that it is now rare to question the existence of God himself. The question itself has been pushed into the private sphere and is no longer a social issue. On the other hand, the fundamental disconnection between religion and contemporary culture is not due to the triumph and strength of 19th and 20th century atheism, but to the changes that have taken place in human culture and understanding, which are no longer founded on religion.

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2 H. de Lubac, *Dramat humanizmu ateistycznego*, trans. from French. A. Ziernicki, WAM, Kraków 2005, 28.

3 Paul VI, *Populorum Progressio*, Vatican City State 1967, no 42.

4 Benedict XVI, *Caritas in veritate*, Vatican City State 2009, no 157.

One of the more interesting and popular solutions to the decline of traditional religiosity concerns the replacement of (institutional) religion, with its rites and moral principles, with a form of spirituality completely detached from the religious dimension, e.g. atheist spirituality. Along with modernity comes a new approach to religious faith, which is spirituality torn from religiosity. Religion is increasingly understood and analyzed from the point of view of institutions, that is principles of operation belonging to particular social groups. Faith becomes an existential possibility that is only for the inner self and does not refer to Transcendence. The above thesis is well illustrated in the works of the French thinker Luc Ferry. He speaks of the Christian incarnation only as the humanization of divinity, which does not refer to transcendence. The more and more frequent use of spirituality from the Far East also strengthens the process of moving from religiosity towards a broader understanding of spirituality.

2. ATHEIST SPIRITUALITY – ANDRÉ COMTE-SPONVILLE

The expression "atheist spirituality" may seem rather paradoxical at first. In practice, both atheists and theists object to it. Atheists would prefer to be called naturalists[5] – in order to emphasize their connection with a specific tradition and interpretation of the world, and avoid being equated only with the denial of theism. They will be willing to deny the existence of any spiritual element, and thus deny the meaningfulness of religious language. It is worth stressing that this does not apply to all atheists.[6] In his essay *Is post-modern*

5 T. Sieczkowski, *Nowy ateizm. Rekonstrukcja światopoglądu*, Wydawnictwo Uniwersytetu Łódzkiego, Łódź 2018, (e-book version).

6 Paradoxically, this seems true even of the most radical modern atheists, such as the representatives of the "new atheism", and especially of the so-called four horsemen of atheism. Sam Harris defends spirituality without religion in his book *Waking Up: A Guide to Spirituality Without Religion*, Simon and Schuster, New York 2014.

spirituality possible?, A. Bielik-Robson gives an interesting description of the problem of spirituality, tracing a connection with post-modernity (the same description also explains why some people have a problem with the term "atheist spirituality"): "one of the characteristic tendencies of the so-called 'postmodern ethics' is to avoid confrontation with spiritual problems; the strategy is to usually to wait for the silent, conceptually doomed problems to cease to exist. For many, the concept of postmodern spirituality sounds like a 'wooden iron'. For what else is postmodernism if not just a radical departure from what was nourished by the spiritual traditions of all previous cultures; separating the idea of 'spirit' grasping its need for existential depth and meaning?… The post-modern world, despite all its inner diversity, has one common characteristic: it is a world of consciousness and accepted contingency (or is it precisely this awareness and acceptance which influences its diversity). Meanwhile, in the spirit world, quite simply, is the world of what is necessary."[7] Theists, however, will often reject the connection of spirituality with post-modernity and atheism. They will be willing to deny atheists the right to have higher spiritual feelings, and those who admit the importance of non-religious spirituality speak of "cryptotheism". Such a reluctance rests on the incompatibility of religion and modernity – metaphysics was relegated to the margins of modern culture and finds no place in the post-modern debate. This seems to entail that there is no place for spirituality either, because of the close connection between metaphysics and spiritual issues.[8]

Post-modernity is completely cut off from metaphysics, which theists are largely still leaning on, wishing to return to the old metaphysical order of the world. This is why they do not give any rights to atheists, as well as to all of post-modernity, to any form

7 A. Bielik-Robson, *Inna nowoczesność. Pytania o współczesną formułę duchowości*, Universitas, Kraków 2000, 265-266.

8 Cf. Ibid., 266-267.

of spirituality. To address this claim, it is necessary to ask what spirituality is and whether it actually conflicts with atheism and post-modernity. This is not an easy task, however, given that it is not possible to reach an agreement on the definition of the term. Following D. Motak, it can be said that "attempts to define spirituality are constantly undertaken, and it is probably without exaggeration to say that there are almost as many definitions of spirituality as there are authors of works on it. Presenting an arbitrary selection of a few of them would bring nothing significant to our considerations."[9]

Due to the fact that attempting to define the very concept of spirituality causes enormous problems, and extensive literature on this subject, philosophy, theology, psychology, sociology and popular science, usually narrowed down the issues to an attempt to answer the following question: With changes in Western civilization that took place under the influence of modernity (broadly understood), can we observe the emergence of a completely new type of spirituality, which can be reconciled with atheism, modernity or postmodernity? Is atheist spirituality, most notably its account developed in France by André Comte-Sponville among others, an example of this?

In literature, we can find four basic accounts concerning the relationship between religiosity and spirituality: recognizing spirituality as a component of religiosity, recognizing religiosity as a component of spirituality, recognizing religiosity and spirituality as separate phenomena, or even in some respects contradictory, and recognizing religiosity and spirituality as phenomena, where their semantic definitions overlap.[10] The third type of relationship between spirituality and religiosity, according to which spirituality completely separates itself from the religious tradition, is becoming more and

9 D. Motak, *Religia – duchowość – religijność. Przemiany zjawiska i ewolucja pojęcia*, Studia Religiologica 43(2010), 212.

10 Cf. J. Piotrowski, *Transcendencja duchowa. Perspektywa psychologiczna*, Liberi Libri, Warszawa 2018, 19

more common. Of course, religious systems still hold onto the idea that both realities are related, since religion is an element of spirituality that provides a safe and open structure. However, spirituality is being practiced more and more often outside explicit religious contexts.[11] Spirituality is no longer associated with any "religious or ecclesiastical institutions, and it is even defined as an alternative to religion and it is quite often not even regarded as an integral part of religion. Religiosity is associated with attachment to doctrines and beliefs enforced by the structures of ecclesiastical authorities, expressed in rituals and practices carried out in community contexts. Spirituality is associated with one's own sense of Self, with the personal search for the *sacred* without the mediation of the Church, with a personal inner experience."[12] Today, this kind of spirituality is referred to as the "new spirituality" in sociology, psychology, theology, and especially philosophy. The expression refers to various phenomena, most commonly associated with the New Age movement.

For the purposes of this paper it will be assumed that, unless otherwise stated, "new spirituality" identifies the form of spirituality that has been shaped in the contemporary world as a result of the changes introduced by modernity into European culture. Its most distinctive feature seems to be individualism, which traces its origins back to the Reformation. André Comte-Sponville defines spirituality as life of the spirit, whereas Descartes defined it as a "thinking thing."[13] The Spirit is something that doubts, understands, claims, denies, wants, does not want, and also imagines and feels. To this, Comte-Sponville adds "something that loves but also doesn't love,

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11 Cf. J. Mariański, *Nowa duchowość jako fenomen ponowoczesności: alternatywa czy dopełnienie religijności?*, in: *Religijność i duchowość – dawne i nowe formy*, eds. M. Libiszowska-Żółtkowska, S. Grotowska, Nomos, Kraków 2010, 24.

12 J. Mariański, *Religia w społeczeństwie ponowoczesnym*, Oficyna Naukowa, Warszawa 2010, 207-208.

13 Cf. A. Comte-Sponville, *L'esprit de l'athéisme. Introduction à une spiritualité sans Dieu*, Albin Michel, Paris 2006, 146.

contemplates, recalls, laughs or jokes."[14] Such a thing is identified with the brain (Comte-Sponville) or an intangible substance (Descartes). "When it comes to spirituality, the problem is the rather too broad understanding of the word 'spirit'. Spirituality in a broad sense would cover all or the majority of human life: the term 'spiritual' would almost be a synonym of the term 'psychological' or 'mental'. The perspective that interests us, we do not think about spirituality in this way. When we talk about spirituality today, it is mostly to point out a part of our lives – generally quite limited, though perhaps open to the limitless – part of our personal inner life, one that has to do with the absolute, infinity, and eternity. It is like the highest peak of the spirit, determining its greatest amplitude. […] A person is a finite being, open to infinity. I can add: an ephemeral being, open to eternity, open to the absolute. This openness, is the spirit. Metaphysics is about thinking, but spirituality is about experiencing, practicing and experiencing. This is what distinguishes spirituality from religion, which is only one of its forms."[15] In practice, it is possible to practice both religiosity without spirituality and spirituality without religiosity.

It seems that the emergence of a spirituality without reference to religiosity is due to modernity and the change in the way we understand people and the attitude to transcendence. Dominika Motak, in her article *The Religion – Religiosity – Spirituality. The Transformation, Phenomena and the Concept of Evolution*, writes: "An extremely important role was played here by the sixteenth-century reformers who, as Hans-Georg Soeffner writes, 'lifted the barriers of morality, legend, tradition, ecclesiastical dogmatics and the scientific faith supported by ritual lying between the single faithful and their God'. Luther argued with conviction that religious merit can be transferred from person to person; therefore, as Steve Bruce puts it, 'he demanded that every person become their own monk'

14 Ibid.
15 Ibid., 143-144.

and emphasized a coherent religious and ethical life (instead of the traditional focus on the periodic purification rituals between which the essentially secular 'weekday' prevailed). In this way, the transition from a 'ritualised part-time activity' to a belief seen as a character-trait took place. This gave a basis oriented towards self-observation, self-interpretation and self-reflection, which resulted in the privatisation and individualisation of religions."[16] The rise of atheism was one of the consequence of modernity, and what followed was the detachment of spirituality from religiosity. On this issue, George Simmel argued that: "one of the deepest pains of the modern-era person is that they are no longer able to continue with the religions conveyed by ecclesiastical tradition, while their religious drive does not weaken."[17] An example of such a "religious drive" is the French atheist Comte-Sponville, who emphasizes that atheism does not deny that there can be something that is absolute. Such a distinction was also stressed by Ludwig Feuerbach, who distinguished between two ways of denying God, one who rejects the existence of a personal transcendent God or any other absolute principles, and the other which just rejects transcendent existence, but accepts the existence of something absolute. What is absolute here means something that exists independently of any conditions, relations or points of view.[18] It is not a personal, transcendent being, existing independently of person and this world. The absolute is not God as all personal supernaturality is rejected by this account, which is the basis of the new spirituality.

The ontological dependence of the spirit on matter does not exclude the fact that the existence of a spiritual dimension must still be accepted. Moreover, the relationship between matter and spirit must be clarified in a way that is exactly the opposite of theism. It is not matter that has been created by the Spirit. Rather, it is the

16 D. Motak, *Religia – duchowość – religijność*, op. cit., 205-206.
17 Ibid., 201.
18 A. Comte-Sponville, *L'esprit de l'athéisme*, op. cit., 150.

spirit that results from the transformation and evolution of matter. In order to characterize a new spirituality, A. Comte-Sponville paradoxically refers to traditional Christian virtues, more precisely to theological virtues, and replaces them with his own proposals: instead of the spirituality of faith, he proposes the spirituality of fidelity. The spirituality of hope replaces action, and the spirituality of love is supposed to be an alternative to the spirituality of fear and subordination. These experiences, in his opinion, lead to mysticism of a non-religious nature.[19]

When a person experiences complete peace, he contemplates the vastness of the world and their self-centeredness becomes less prominent. When a person permeates the conviction of unity with the surrounding vastness, he becomes a symbol of this new mystical spirituality. However, this experience has an emotional-aesthetic nature more than a religious or spiritual one. We are simply dealing here with an "oceanic feeling", that is, the experience of ourselves in unity with everyone. It is a type of instatic mysticism (from gr. *in-statis*, "to be in yourself"). The path to true reality does not lead through the outside world. Rather, it is found in the person, it is our "me" or "self". This "me" does not equate with the self on a purely mental level. The path to unity with something absolute is found through the inner human being. It is necessary to learn to detach from externality, which is only an illusion, and to know that spiritually is the deepest truth of one's identity with divinity. R. Otto suggests that we can find such a mysticism in yoga, for example.[20] It is the "pure" mysticism of the soul. The soul is not a place to encounter a God that is separate from the soul. Rather, the soul becomes God itself. This is not so much ecstasy but "enstase" (as referred to by

19 Cf. Ibid., 148.

20 Cf. R. Otto, *Mistyka Wschodu i Zachodu. Analogie i różnice wyjaśniające jej istotę*, trans. from English T. Duliński, KR, Warszawa 2000, 165-166.

Elijah), which is the experience of the self within immanence. It is also a purely natural experience.

According to Comte-Sponville, in this experience we find such elements as silence, mystery and obviousness along with fullness, simplicity, unity, acceptance, death and eternity. The first element is silence, which is not a lack of conversation but the suspension of reason. This stance is not irrational, as Comte-Sponville argues. Silence is about the contemplation of reality, which does not have to turn into a rational discourse. It is the contemplation of the truth itself – that is, reality. In this way silence is the original contact of a person with the world around them. However, Comte-Sponville fails to acknowledge that one intuitive or pre-reflective aspect of reality is the ability to create concepts. Contemplation is also rational and a manifestation of the cognitive abilities of a person. In this case, atheist spirituality equates with the functioning of human cognitive abilities. Mystery and obviousness are further elements of this account of spirituality, which is the delight of the mystery of existence. There is only being, and the question "why is there something rather than nothing?" makes no sense as the very fact of existence is obvious. The mystery of being is reduced to the obviousness of being. Why not face the question of existence, the origin of existence, the cause or reason of existence?

In a sense, atheist spirituality arises from neglecting the most important question: why is there something rather than nothing? It turns out that the new spirituality has nothing to propose on this matter, apart from the claim that there is no secret of being, there is only being. Mystery and the world become one. From the experience of the obviousness of being or existence, comes the deepest joy due to completeness. There is existence and only existence, is it possible to desire more? This is certainly a very optimistic assumption by A. Comte-Sponville: such experiences of completely losing attachment to life and contingency, as well as the absence of suffering, are not

frequent. These are very rare events, and it is probably difficult to build one's spiritual development on them.[21]

The experience of mystical existence also brings about the experience of simplicity and unity. Simplicity is about focusing on what is essential and important. This, as Comte-Sponville writes, amounts to "being with oneself to the point that we no longer have ourselves, because there is only one thing left, only action, only consciousness."[22] From this follows unity, that is lived on two essential levels: the unity of the world and the unity of a person.

The next stage in this spiritual journey is the experience of eternity, which is not understood in a theistic sense. It is rather an experience of the present, because neither the future nor the past actually exist. There is only lasting time. Even past events are present as memories, and the future as present expectations or hopes. Everything that exists inside and outside of us is present. Hence, the present is everything, it is even eternity, but an eternity here and now. Even the idea of death ceases to cause fear since there is only the present and there is no point in expecting any other eternity. Comte-Sponville's proposal to identify the present with eternity is not new or original: this idea was already introduced by the Stoics. As for Comte-Sponville's account, it seems too optimistic to be entirely true or attainable in everyday life.[23]

This project of atheist spirituality culminates in the concept of unconditional acceptance, which is the attitude of saying "yes" to everything that happens. It is not the approval of everything, but the adoption of a peculiar attitude of non-religious faith according to which everything that is, is true. Faith is the foundation of our life, not some additional (or unnecessary) aspect of it. Each person builds their life on numerous elements of faith, understood as a form

21 Cf. A. Comte-Sponville, *L'esprit de l'athéisme*, op. cit., 170-171.
22 Ibid., 173.
23 Ibid., 180-181.

of entrustment: that is, faith is not related directly with religion. It is often an act of trusting another person. More precisely, it is about an even more fundamental attitude that permeates everything: it anticipates every act, decision, thought, and above all, it marks the first, most basic contact with the surrounding world.[24]

However, an important question arises as to whether this new spirituality can meet the most important "challenge" to any spirituality, namely the mystery of death. As already mentioned, immersion in the present is intended to put aside its inevitability. Comte-Sponville states that it will only take away the future and the past, but not the present. The present does not take the whole person, only a part. However, this does not explain the problem of the death of other people. In the context of the lives of the people we love and our family, death also takes away the future that you want to naturally share with your loved ones. Therefore, the theistic account of death will always be much more optimistic and easier to accept. In his book *Live until Death*, the late Paul Ricoeur formulates the concepts of a horizontal and vertical resurrection. Horizontal resurrection concerns our existence in the works that we have left behind, in the memories of other people, and in the life we have passed down to our children. It simply means the continuance of the good we have done in the course of our earthly existence. Vertical resurrection, which is the essence of the Christian message, indicates the necessity of existing in such a reality that will collect all the good done and ensure its durability, not only partly, as perpetuated in other people, but all the good that was shared by people. The end of good cannot be the mortality inherent in our nature. Although this is not a purely philosophical argument, it is certainly an interesting assumption that enables us to complement natural spirituality with supernatural spirituality.[25]

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24 Ibid., 184-185.

25 See P. Ricoeur, *Vivant jusqu'à la mort. Suivi de Fragments*, Seuil, Paris 2007.

The atheist spirituality outlined above is based mainly on the experience of a unity with the existing world, the acceptance of its existence and diversity. As Comte-Sponville states, it is something special. It is not your regular everyday experience. Hence the reference to mysticism, which also belongs to experiences of a unique nature in theism. However, the "new mystic" leaves no room for an appeal to a personal God. God becomes redundant, because the experience of uniting the concept of existence with peace and acceptance, fills man completely and leaves no room for anything else. From this, Comte-Sponville's concludes that God, who is no longer missing, ceases to be God. "There is no God, there is only a dream without a dreamer, a dream that contains all dreams: it is a world into which we can only enter under the condition that we wake up."[26] The question that arises here concerns the originality of Comte-Sponville's proposal and whether this kind of spirituality is in fact atheistic, leaving no room for God.

3. LUC FERRY'S CONCEPT OF NEW SPIRITUALITY

A similar concept was suggested by Luc Ferry.[27] His main thesis describes two processes which take place in a religious and a secular space, respectively. On the one hand, we are dealing with the humanization of divinity, whereas on the other, the process of "divinization" (deification) of a person. The humanization of divinity is nothing more than the denial of the existence of Transcendence. This is in line with the contemporary critique of metaphysics and reduces the understanding of religion to a purely human endeavor. Religion is not a personal relationship with God, but merely a possible

26 A. Comte-Sponville, *L'esprit de l'athéisme*, op. cit., 205.

27 L. Ferry, *L'homme-dieu ou le sens de la vie*, Autres Temps Année, Paris 1996. For his views on religion, see also L. Ferry, L. Jerphagnon, *La Tentation du chistianisme*, Grasset, Paris 2009; L. Ferry, *Apprendre à vivre*, Plon, Paris 1996; L. Ferry, M. Gauchet, *Le Religieux après la religion*, Grasset, Paris 2004.

area for personal development. There are still people who accept the existence of a reality that goes beyond the finite order, but they increasingly begin to "abandon traditional dogmas and turn to the ideology of human rights."[28] For example, when it comes to moral issues we can't help but notice how selectively practicing religious people treat what the Church allows, orders or does not allow. Ferry claims that the suggestion of the primacy of moral truths over freedom found in the encyclical of John Paul II *Veritatis Splendor* is unacceptable to a modern person. Moral dilemmas are no longer dealt with from a theological perspective, but only from a universal human perspective. The humanization of divinity, that is, keeping the religious dimension only in a horizontal perspective, is a complete renunciation of the very basis of religion. Ferry proposes replacing religious spirituality, which in his opinion no longer refers to the personal God, with the "new spirituality", closely connected with the notions of sacrifice and person. Despite what the representatives of traditional religions, most notably Christians, sometimes claim, today we are not facing an increase in nihilism or ungodliness. Rather, we face an authentic return to ethics and traditional values.[29] According to Ferry, the basic feature of the "new spirituality" is the concept of holiness, defined in a completely different way than in religious narratives. Holiness comes down to emphasizing the almost sacred character of human dignity. It is the only value for which people are willing to give up their lives. Nowadays, a person is not at all willing to sacrifice their life for the state, God or any ideology. Only another person whom we love can influence us into a sacrificial action, including giving up our life for them. It is the "sacralization (deification) of humanity", which presupposes "the transition from what might be called 'vertical transcendence' (these are external being more important than the individual so to speak), to ,horizontal

28 L. Ferry, *L'homme-dieu ou le sens de la vie*, op. cit., 46.
29 Ibid., 78.

transcendence' (the transcendence of others towards myself)."[30] The "Other", whom often is our "Closest" becomes the basic determinant for ethical relations. Modern thought, according to Ferry, rejects any attempts to explain the character traits of human dignity through the category of the "sacred". From what do they derive their ultimate justification, then? Does human dignity have no ontical-transcendent justification? Ferry does not address these questions.

Ferry, however, does not completely dissociate himself from religious systems. His spirituality also draws from Christianity. In his *La Tentation du christianisme*,[31] he tries to describe the process that takes place between Christianity and Western civilization. On the one hand, the Christian faith has ceased to function in public spaces and it is often reduced to the private sphere. On the other hand, Christianity is still a strong tradition that stands at the roots of our culture. Christianity cannot therefore be ignored or omitted in modern discourse, for doing so would eventually lead to the "deculturalization" of Europe. Ferry agrees with the historian Jerphagnon, in tracing the influence of Christianity back to the Greek tradition to find a new way of introducing Christianity in modern society. According to Jerphagnon, the "success" of Christianity in ancient times is explained by Roman pragmatism (it was a new religion capable of uniting the empire) and a completely different concept of religiosity, which refers to individual testimony, leaning toward martyrdom. However, according to Ferry, the confrontation between Greek philosophy and Christianity concerned a broader intellectual spectrum. The "Christian Revolution" stood in opposition to two main theses of Greek philosophy. Firstly, the world is impersonal, even if it contains harmony; secondly, the purpose of life is a good life on earth, not only the search for eternal life. Living in harmony with the universe allows one to overcome the fear of death. Christianity

30 Cf. Ibid., 89.

31 L. Ferry, J. Jerphagnon, *La Tentation du christianisme*, op. cit.

rejects this idea on three fundamental levels: theory, morality and salvation. On a theoretical level, it is the personalization of the universe that is the result of the new religion. The universe is no longer ruled by impersonal principles, but is permeated with love, which also expresses the idea of the Incarnation. Moreover, such a world can no longer be known through reason. It requires not only theoretical knowledge, but faith. That is, an action of trust in the Creator. Christianity also replaced philosophy in representing a "way of life" and "spiritual exercise". The domain of philosophy was limited to the analysis of concepts. Philosophy stopped to be the search for wisdom. In turn, the Christian revolution, by introducing the idea of the equality of all people before God changed the hierarchical structure of Greek society. Every person is created in the image and likeness of God. It does not matter what social class they belong to. This was the most substantial revolution proposed by a Christian doctrine. The last change brought about by Christianity concerned the soteriological spectrum. Salvation is the purpose of human life and it became an individual and conscious endeavor carried out both through actions and destiny – because it is Christ, a divine person, who saves and offers salvation to every human being. A radical novelty of Christianity is also the idea of the resurrection of the body, based on selfless love practiced in life.[32] It is a pity that Ferry does not see that even today an essential element of the Christian religion is the proposal of personal salvation, the source of which is God himself. No "new spirituality", even if it is capable of self-sacrifice, offers life after death. Such a personal salvation, understood as the continuance of existence in the new reality after death, is a specifically religious proposal.[33] Non-religious spirituality cannot solve the essential

32 Cf. Ibid., 94.

33 An interesting analysis of the various concepts of salvation, both religious and non-religious, can be found in the work of I. Ziemiński, *Życie wieczne. Przyczynek do eschatologii filozoficznej*, W drodze, Poznań 2013.

challenge of the human death which every spirituality faces, whether religious or atheist.

Ferry's concept of spirituality refers to a specific notion of transcendence, understood as "transcendence within immanence". Ferry's transcendence was strongly criticized by Marcel Gauchet. In their co-authored book *Le Religieux après la religion*,[34] they clarify their respective positions in the new dimension of religiosity. Ferry reiterates his thesis that traditional religion, speaking of a personal God wants to create a moral law and build a society. According to him, it is precisely this idea that is in decline. Criticism of the Transcendence of a personal nature does not mean that there are no longer people who believe and practice traditional religions. According to Ferry, however, this is ultimately a matter of individual choice. Gauchet agrees with this, but he derives different conclusions from his analysis of today's religiosity than Ferry's. Ferry tries to argue that the "humanization of divinity" and the "sanctification of a person" lead to a slow discovery of transcendence in immanence. This process leads to the need to transcend secular ethics, which in certain situations becomes helpless, e.g. when it comes to issues of death, suffering and the meaning of life. Such a need does not arise with respect to specific religions; rather, it is about something that transcends a purely temporal dimension. Transcendence is becoming an ethical horizon, but of a very unspecified nature. It is a concept so vague that it is hard to understand what it is supposed to mean. Gauchet is even more inconsistent than Ferry because he does not accept such an undefined transcendence. In his opinion, it still has the characteristics of religious transcendence. He proposes to replace it with an "earthly absolute". How should this expression be understood? First of all, it is the negation of metaphysical transcendence. Only certain dimensions transcend experiential categories: e.g. selfless love, which is the pursuit of profit. Certain values transcend others.

34 L. Ferry, M. Gauchet, *Le Religieux après la religion*, op. cit.

As Ferry states: "the transcendence of freedom, so to speak, not only exists in us but also outside of us: it is not we who invent values that guide and move us, it is not we, for example, who invent the beauty of nature or the power of love."[35] They exist independently of us.

4. ALAIN DE BOTTON'S PROJECT TO CREATE A RELIGION FOR ATHEISTS

The Swiss thinker Alain de Botton, in his *Religion for Atheists*,[36] claims that he is not interested in the question of the truth of religion. In his opinion "religion is not true in any sense given by God."[37] This question does not make sense. Moreover, he does not intend to address issues relating to the existence of the Absolute and, consequently, the veracity or falsity of religious claims. His purpose is to show that religion can be useful, interesting and even comforting. The atheist can also apply religious ideas and practices to the secular world.[38] De Botton lists religious elements that can inspire a non-believer: community, kindness, education, tenderness, pessimism, perspective, art, architecture, institutions.

The religious community can motivate us to see a potential friend in the other person, rather than an enemy. Unfortunately, in today's world everyone is a potential threat to everyone else. Thanks to religious affiliation, one can expect help and understanding just because they are a member of a religious community. According to De Botton, in the contemporary world such an attitude is hard to find, although to some extent religion continues to promote it. Why should the "new spirituality" not follow its example?[39]

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35 L. Ferry, *Apprendre à vivre*, op. cit., 293.

36 A. de Botton, *Religion for Atheists. A non-believer's guide to the uses of religion*, Pantheon, London 2012, (e-book version).

37 Ibid., 10.

38 Cf. Ibid., 11.

39 Cf. Ibid., 42.

Kindness, another postulate of De Botton's atheist spirituality, consists restoring an ethical dimension to life, an assumption we can clearly find in religious systems. To be clear, this is not about introducing, for example, Christian ethics as a normative system. Rather, it is about maintaining ethical reflection, which should be an important element of both individual and community reflection.[40]

Religious education can also be a model for an atheist society, given that knowledge does not coincide with scientific knowledge and aims to promote the development of the whole person, including the dimension we call spirituality and which religion calls the soul[41].

Tenderness, for instance as personified in Mary in the Christian religion, is another element that can fascinate an atheist. It draws attention to the emotional side of a person, which is also important and cannot be neglected in modern spirituality.[42]

The paradoxical elements referred to by De Botton are religious pessimism and perspective. These two elements teach us a healthy distance from reality.[43] Unfortunately, atheism is sometimes a naive position – for instance, by believing that progress will eliminate all the possible pains of this world.

Two more religious patterns are art and architecture. According to De Botton, modern art and architecture have ceased to delight and have become incomprehensible to people who are not expert. Art has ceased to arouse emotions that are easily shared with others.[44]

The final postulate of a religion for atheists is to look at religious institutions, usually the most criticized aspect of any religion. De Botton, however, sees their positive side. It is the institutions that give us a sense of identity and implement the rituals by which spirituality

40 Cf. Ibid., 94.
41 Cf. Ibid., 161-162.
42 Cf. Ibid., 165.
43 Cf. Ibid., 187.
44 Cf. Ibid., 207.

is realized. Perhaps it would be worth considering similar institutions in a secularized society, says De Botton.[45]

De Botton's project to create a religion for atheists is interesting, but as Andrzej Draguła notes, it is essentially a sacred, non-religious proposal.[46] Although it is not a critique of religion (rather, it criticizes the modern world and atheism), it fails to perceive the value of religion as such. Religion has positive elements on the condition that they are independent of any reference to Transcendence.

5. CONCLUSION

Summarizing the considerations of the Francophone philosophers, it can be said that the new spirituality they suggest is first of all the resignation from a faith in a transcendent God and the search for an undefined sacrum (what is holy, is highest) in immanence. As Anna Kubiak argues, such an understanding of spirituality has a positive impact on several aspects of life, such as the experience of art and nature, the issue of life after life, the concept of healing as understood in alternative medicine, secular thought (e.g. science), activism for animal rights and the experience of a unity with the universe.[47] New spirituality is becoming a popular alternative to religious spirituality. However, both spiritualities should not be treated as separate sets, they do not have to compete with each other. Systems of spiritual development belonging to specific religions will always provide inspiration even for atheist spirituality. The latter indicates that apart from religion, there is also a spiritual dimension that can develop in a person. Beyond religion, there is not only nihilism, as sometimes the defenders of the old religious order try to show. Sometimes, one can find realities that are nevertheless rich and enriching.

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45 Cf. Ibid., 298.

46 Cf. A. Draguła, *Ateistyczna imitacja religii?*, Więź (2018)2, 168-177.

47 Cf. A. Kubiak, *Duchowość Nowej Ery*, Studia Socjologiczne 1(2002), p. 45.

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