Russian Journal of Sociology

Has been issued since 2015.
E-ISSN 2413-7545
2019. 5(1). Issued once a year

Journal is indexed by: CrossRef (USA), OAJI (USA).

All manuscripts are peer reviewed by experts in the respective field. Authors of the manuscripts bear responsibility for their content, credibility and reliability.
Editorial board doesn't expect the manuscripts' authors to always agree with its opinion.

Postal Address: 1367/4, Stara Vajnorska str., Bratislava – Nove Mesto, Slovak Republic, 831 04

Website: http://ejournal32.com/
E-mail: aphr.sro@gmail.com

Founder and Editor: Academic Publishing House Researcher s.r.o.

Release date 20.09.19.
Format 21 × 29,7/4.

Headset Georgia.

Order № RJS-7.

Russian Journal of Sociology

2019

Is. 1

C O N T E N T S

Articles

Published in the Slovak Republic
Russian Journal of Sociology
Has been issued since 2015.
E-ISSN 2413-7545
2019, 5(1): 3-18

DOI: 10.13187/rjs.2019.1.3
www.ejournal32.com

Articles

The Evolution of Professional Education at the Votkinsk and Izhevsk Factories in Retrospect

Olga Yu. Larionova [a, *], Lyubov L. Nizhegorodova [b]

[a] Votkinsk branch of Kalashnikov's ISTU, Russian Federation
[b] The Ekaterina the Great Lyceum, Khimki, Russian Federation

Abstract

The article analyzes the dynamics of technical education development in Izhevsk and Votkinsk from the beginning of the XIX century to the present day: from the mining school to the university. The complexity of factory technologies has led to a significant increase in the period of specialist training and the number of subjects studied: from 6 years and 8 academic disciplines in the early XIX century to 16-17 years (including the secondary education) and more than 100 disciplines by the beginning of the XXI century. A study of the first years of the Izhevsk mechanical institute and IMI first branch in Votkinsk revealed a deeper cultural connection with the Bauman Moscow state technical university than previously thought. By establishing the official patronage links between the country's leading technical university and the newly created institute in the peripheral region, the government managed to decentralize the training of high-quality personnel for industrial enterprises and other sectors of the Udmurtia economy.

Keywords: the history of Udmurtia, the history of Izhevsk, the history of Votkinsk, the Votkinsk plant, technical education, construction engineering in Votkinsk, higher education, MVTU named after N.E. Bauman, IzhSTU named after M.T. Kalashnikov, Votkinsk branch of IMI-IzhSTU.

1. Введение

С организацией Воткинского (в 1757 г.) и Ижевского (в 1760 г.) железоделательных заводов появилась необходимость в грамотных специалистах для обслуживания производства, которая стала реализовываться через направление на заводы выпускников Санкт-Петербургского Горного университета, основанного в 1773 году, и приглашение иностранных специалистов. Однако подобная практика являлась очень затратной и недостаточно эффективной для обеспечения нужд активно развивающихся производств, поэтому было решено перейти к иной модели рекрутинга. Историко-системный метод позволил обобщить накопленный историографический материал о зарождении и развитии образовательных структур на территории современной Удмуртии, и сформировать целостную картину событий и процессов, происходивших в развитии инженерного образования на базе заводов от начала XIX в. до современности. В научный оборот вводятся новые документы, извлеченные из архивов: республиканского и ИжГТУ имени М.Т. Калашникова.

* Corresponding author
E-mail addresses: olga_lario@mail.ru (O.Yu. Larionova)

2. Результаты и обсуждение

Первые учебные заведения профессиональной направленности

На территории современной Удмуртии именно на Воткинском заводе, как одном из важнейших промышленных предприятий Российской империи, были открыты первая горная школа в 1807 году (в Ижевске в 1808 г.), первая в Приуралье техническая библиотека в 1823 году, первая женская гимназия в 1902 г. (в Ижевске в 1917 г.) и первая мужская гимназия в 1912 г. (в Ижевске в 1914 г.). (Васина, 2006; Аншаков, 1985) Горная школа с трёхклассным обучением стала первым учебным заведением, где дети мастеровых получали не только начальное образование, но и профессиональные навыки. Учебный план школы состоял из 8 дисциплин, обучение в каждом классе продолжалось по два года (ЦГА УР, Ф. 212, Оп. 1. Д. 586. Л. 53-53 об., 119-119об.). До старшего, или «высшего» класса школы допускались лишь самые способные из учеников, он назывался школой приказнослужителей. После успешного окончания высшего класса школы мастерские дети могли дослужиться до поста крупного заводского чиновника. Так, сын мастерового Василий Степанович Губанов 1799 года рождения после окончания малой горной школы с 14 лет начал заводскую службу, и на 1836 год он имел чин маркшейдера 9 класса и занимал должность главного бухгалтера завода (ЦГА УР, Ф. 212. Оп. 1. Д. 4409. Л. 56 об. – 57). Мастеровой Денис Иванович Пушин стал учителем черчения и рисования в горной школе, а позднее – помощником архитектора в заводской чертёжной, с 1848 года – преподавателем географии и грамматики в Окружном училище (ЦГА УР, Ф. 212. Оп. 1. Д. 4409. Л. 84; Гаевский, 1998). Казначеем при Управлении Камско-Воткинского округа стал на 1897 год и выпускник горной школы Феопемпт Васильевич Глазырин 1837 года рождения (ЦГА УР, Ф. 236. Оп. 1. Д. 63. Л. 501-502; Ф. 212. Оп. 6. Д. 803).

В 1845 году на Воткинском заводе началась эра судостроения. С 1848 до 1903 гг. поставщиком квалифицированных кадров для Воткинского завода стало первое в Среднем Прикамье среднее учебное заведение – 4-х классное Окружное училище, организованное в здании школы приказнослужителей по ул. Конторской (Кирова, 3). В училище принимали успешно окончивших заводскую школу учеников (Ларионова, 2019; Кутявин, 2006; Гаевский, 1998). Учебный план училища состоял из 13 дисциплин, включая практические занятия по столярному, слесарному и кузнечному делу (ЦГА УР, Ф. 212, Оп. 1. Д. 8851. Л. 14; Нельзин, 2003). Преподавателями училища были выпускники Императорского Казанского университета со степенью кандидата математических наук М.В. Блинов и Петербургского Горного института И.П. Котляревский, будущий управитель Воткинского завода (Гаевский, 1998). Окружное училище для многих детей мастеровых стало трамплином для построения успешной карьеры: на 1876 год бухгалтером главной конторы Камско-Воткинских заводов (главным) служил 33-летний губернский секретарь Дмитрий Николаевич Вострокнутов, смотрителем металлов 36-летний губернский секретарь Сергей Козьмич Кучашев (ЦГА УР, Ф. 212. Оп. 1. Д. 9111. Л. 15, 27). На 1897 год выпускник училища 1876 года сельский обыватель Алексей Васильевич Овчинников 1860 года рождения работал старшим мастером Воткинского завода (ЦГА УР, Ф. 236. Оп. 1. Д. 53. Л. 135-136; Ф. 409. Оп. 1. Д. 89. Л. 1). Выпускник Окружного училища сельский обыватель Василий Феопемптович Глазырин 1879 года рождения на 1916 г. являлся казначеем завода (главным), а 1918 год встретил в чине коллежского асессора и смотрителя завода (ЦГА УР, Ф. Р- 785. Оп. 2. Д. 1. Л. 10 об.; Ф. 212. Оп. 6. Д. 803; Памятная книжка, 2016). Выпускником училища 1892 года был выдающийся воткинский конструктор по судовым корпусам и судовой технике Захар Васильевич Сумароков 1876 года рождения, который с 1912 по 1919 гг. работал начальником технического судостроительного бюро Воткинского завода (ЦГА УР, Ф. 409. Оп. 1. Д. 89. Л. 2 об.; votmuseum.ru; Добровольский, 2009, С. 60). В 1903 году Окружное училище было преобразовано в 4-классное городское училище (Высшее начальное училище) (Гаевский, 1998).

Воткинское механико-техническое училище с шестилетним курсом обучения было открыто в 1907 году и занимало 11 учебных комнат и одну лабораторию в Николаевском корпусе завода. В Ижевске механико-техническое училище было открыто в 1909 году. По уровню профессиональной подготовки выпускники училища считались одними из лучших на горнозаводском Урале (Кутявин, 2006). Макеты токарных станков, слесарный инструмент, а также чертежи сельскохозяйственных машин, изготовленные студентами

Воткинского училища, получили в 1913 году Золотую медаль Всероссийской выставки. Выпускник техникума 1914 года Григорий Дмитриевич Давыдов (1893 г. р.) был плодотворным рационализатором, заведовал паровозным цехом, с 1925 года возглавлял механико-металлографическую лабораторию и отвечал за технический контроль изделий Воткинского завода, с 1931 по 1938 гг. был начальником отдела лабораторий (Сорокин, 2003). В ноябре 1918 г. оба эти училища были закрыты в связи с Гражданской войной.

Первые ВТУЗЫ Ижевска

После окончания Гражданской войны молодая социалистическая республика приступила к восстановлению отрасли тяжёлого машиностроения. С 1921 по 1937 гг. Ижевск и Воткинск были причислены к разным административно-территориальным образованиям в связи с восстанием в 1918 году рабочих Воткинского и Ижевских заводов против власти большевиков и организацией Воткинской Народной армии, одного из самых боеспособных формирований в армии Колчака.

Для подготовки технических кадров для Воткинского завода 1 марта 1920 г. был открыт Индустриальный техникум, в 1922 году он был переименован в механический, а в 1932 г. – в машиностроительный (Ашихмина, 2007). В 1928 году в Воткинском техникуме впервые на Урале было открыто вечернее отделение, а до тех пор действовала только дневная форма обучения по специальности «холодная обработка металлов» (Добровольский, 2009: 99, 111, 258, 259). В городе Ижевске Индустриальный техникум был открыт только в 1929 году, в настоящее время это Ижевский Индустриальный техникум имени Евгения Фёдоровича Драгунова (ИИТ имени И.Ф. Драгунова). А до тех пор ижевские подростки учились в Воткинском техникуме. За обучение этих детей ГОРОНО Воткинска в 1929 году согласно договору получило более пяти тысяч рублей (ЦГА УР, Ф. Р-370. Оп. 1. Д. 771. Л. 46).

В 1928 году был принят первый пятилетний план развития народного хозяйства СССР на период с 1929 по 1933 год, для выполнения которого было решено открывать ВТУЗы и ССУЗы (высшие технические и средние специальные учебные заведения) на базе всех крупных предприятий страны. Единственным в те годы на Урале был открытый в 1920 году Уральский механико-машиностроительный институт (Уральский политехнический институт имени С.М. Кирова, в настоящее время УрФУ) (УрФУ).

30 октября 1930 года в городе Ижевске при Ижстальзаводе были открыты Высшие технические курсы – первый ВТУЗ на территории современной Удмуртии (izhevsk-history.ru). Монументальный корпус ВТУЗ-комбината на Верхней Базарной площади (в 1918–1936 гг. ул. Коммунальная, позже – ул. Горького, 79) был построен менее чем за два года и открыт 7 ноября 1932 г. Это было тогда самое большое здание города: учебно-лабораторный корпус занимал площадь 10500 кв. м. В это здание были переведены также часть подразделений Индустриального техникума и некоторые службы Ижстальзавода, в том числе музей завода. Высшее техническое учебное заведение при Ижевских оружейном и сталеделательном заводах (ВТУЗ-комбинат) действовало с 01.01.1930 по 01.01.1931 гг., затем ВТУЗ был прикреплён к Ижевскому заводу № 10 Наркомата тяжелой промышленности СССР, а с 01.01.1932 г. был преобразован в Ижевское отделение Уральского металлургического института "Сталь", который 01.01.1940 года прекратил свою деятельность (ЦГА УР, Ф. Р-1052).

По материалам историка, проректора по заочному и вечернему обучению ИМИ в 1962–1977 гг. Л.А. Пантюхина (годы жизни 1926-2009 гг.), в 1930 году при Ижстальзаводе открылся вечерний филиал Ленинградского военно-механического института (ЦГА УР, Ф. Р-1862. Оп. 1.; Пантюхин, 2004). Однако Военно-механический институт (в настоящее время БГТУ «ВОЕНМЕХ» им. Д.Ф. Устинова) был организован только 26 февраля 1932 г., когда был подписан приказ № 109 Народным Комиссаром тяжёлой промышленности С. Орджоникидзе (ВОЕНМЕХ). Ранее этот институт назывался Механическим и был создан в составе Ленинградского механического учебного комбината постановлением Президиума ВСНХ СССР № 14 от 13 июня 1930 года (ЛВМИ). Поэтому информация о появлении филиала ленинградского института в Ижевске в год его образования выглядит сомнительной. Однако точных данных о начале и окончании деятельности данного учебного заведения обнаружить не удалось. С 1934 года на вечернем отделении Ижевского филиала Ленинградского военно-

механического института учился Владимир Николаевич Новиков (1907-2000 гг.), Герой Социалистического Труда, генерал-майор инженерно-артиллерийской службы, Председатель Госплана СССР, Председатель ВСНХ СССР и заместитель Председателя Совета Министров СССР. По его воспоминаниям, членами государственной экзаменационной комиссии (ГЭК) являлись крупные учёные Ленинграда во главе с директором военно-механического института, которые специально для этого приехали в Ижевск и проэкзаменовали каждого из студентов по всем темам учебного плана специальности. К защите дипломных проектов были допущены только те, кто успешно выдержал многочасовой экзамен. И только треть студентов из сдавших экзамен получили дипломы инженеров Ленинградского военно-механического института, остальные товарищи продолжили учебу, углубляя свои знания, и защитили дипломы на следующий год (Щербаков, 2016).

Один за другим в Ижевске открывались институты: в 1931 году педагогический (в настоящее время УдГУ), в 1933 году медицинский (в наст. время ИГМА) (УдГУ; ИГМА).

Не ВТУЗ, а ССУЗ Воткинска

Первая попытка создать ВТУЗ в посёлке Воткинск состоялась в 1931 году. На тот момент он территориально принадлежал к Уральской области, а гор. Ижевск – к Вотской автономной области (ВАО). В 1930 году Воткинский завод перешёл на производство сложной машиностроительной техники, получив задание освоить производство высокопроизводительных экскаваторов и золотодобывающих драг, способных эффективно извлекать драгоценный металл из песка даже с низким содержанием золота. С 1927 по 1930 гг. была проведена реконструкция завода, выпускавшего с 1925 года только сельхозтехнику. Была создана конструкторская группа по экскаваторостроению и научный центр по дражному делу. Задачами Центра стало изучение работы драг на местах эксплуатации, создание новых научных разработок и усовершенствований драгостроения, а также подготовка инженерно-технических кадров. Куратором Центра стал начальник объединения «Главзолото» А.П. Серебровский, в 1933–1934 гг. машиностроительный завод и воткинский техникум были частью этого объединения. Основная часть инженерных должностей на Воткинском заводе на тот момент была занята рабочими, обладающими большим практическим опытом, и выпускниками механико-технического училища. В октябре 1931 года руководство машиностроительного завода при прямом участии Серебровского добилось открытия в г. Воткинске ускоренного курса подготовки инженеров на базе вечернего отделения Механического техникума (ВМТ). Программа курса была рассчитана на 2 года вечерних занятий. Одна группа (30 человек) специализировалась по драгостроению, другая (20 человек) – по холодной обработке металлов резанием. На обучение новым специальностям принимали работников завода, имеющих среднетехническое образование и стаж работы на заводе не менее 5 лет (Воткинский завод, 1999: 70, 72; Добровольский, 2009: 183, 204, 206).

Из-за нехватки учебных площадей в 1931 году техникуму было предоставлено здание по ул. Кирова, 3 – бывшую женскую гимназию Е.Г. Котковой, а ранее студенты обучались в здании заводоуправления и Николаевском корпусе завода. До сих пор считалось, что здание бывшей женской гимназии Воткинский горсовет передал ВМТ в 1938 году. В частности, информация об этом размещена в исторических альбомах ВМТ и была озвучена на страницах газеты «Трудовая вахта» директором ВМТ В.М. Беззвановым в 2007 году (Ашихмина, 2007). Однако на основе личного исследования архивных фотографий выпускников техникума в фондах архива ВМТ им. В.Г. Садовникова был сделан иной вывод: здание было предоставлено ВМТ именно в 1931 году, т.к. на фотографиях выпускников техникума до 1931 года изображали здание Николаевского корпуса, а с 1932 года начали размещать здание по ул. Кирова, 3, что свидетельствует о том, что последний учебный год выпускники 1932 года учились уже в новом здании.

Читать лекции были приглашены преподаватели Уральского механико-машиностроительного института (город Свердловск) и Восточно-Сибирского горного института (город Иркутск). В Воткинск были направлены для постоянной работы главные специалисты в СССР по драгам – инженеры: В.П. Серебренников, возглавивший драгостроение на заводе, А.С. Багин (Бажов), назначенный начальником внешних работ по

драгам, и Л.И. Александров – ведущий конструктор по драгам из гор. Пермь. Курс монтажа драг читал профессор Иркутского горного института А.П. Свиридов, приехавший для этого на два месяца в Воткинск (Воткинский завод, 1999: 72, 73; Добровольский, 2009: 206).

Группа драгостроителей состояла из 20 воткинцев и 10 человек из Иркутского завода. После окончания теоретического курса без отрыва от производства в 1934 году, студенты защищали свои дипломные проекты в вышеназванных институтах. Первыми подготовленными в Воткинске инженерами, которые в 1934 году защитили дипломные работы по драгострострoению в Уральском мехмашинституте, стали Игорь Анатольевич Добровольский и А.А. Хомяков. В 1936 г. дипломные работы по холодной обработке металлов в Уральском политехническом институте защитили: Д.И. Разживин, А.И. Аристов, А.И. Быстров, М.В. Ладыгин, Л.М. Медведев, П.А. Мокрушин, А.Е. Столов, Г.А. Рожков и А.Д. Шестаков (Метляков, 1983; Добровольский, 2009: 210).

Первая и единственная группа инженеров – драгостроителей, обучавшихся на базе техникума в 1931-1934 гг. Фотография была атрибутирована до сдачи государственных экзаменов: не всем представленным на фото студентам удалось получить диплом инженера (по данным на 1936 год). В верхнем ряду преподаватели – инженеры-конструкторы (слева направо): преподаватель техникума и начальник заводской механической лаборатории Г.Д. Давыдов, В.П. Серебренников, Н.П. Сыпачев, А.Л. Добровольский и А.П. Кениг (Рисунок 1).

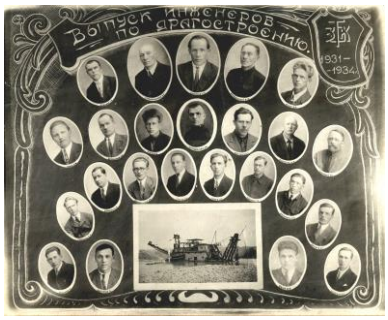

Рис. 1. Фото 1934 г. Архив ВТМ

Известный воткинский краевед И.А. Добровольский утверждал в своей книге «Воткинский завод на рубеже эпох (заметки конструктора)», что учился в Воткинском филиале Уральского механико-машиностроительного института (Добровольский, 2009, 204, 210, 258; Карпова, 2019). Однако нельзя согласиться с этим утверждением: в 1931 году состоялась лишь первая попытка создать ВТУЗ в посёлке Воткинск (а их было несколько!). В 1931–1934 гг. в Воткинске на базе вечернего отделения техникума прошли ускоренный курс обучения 50 студентов, из которых дипломы инженеров в 1934-1936 гг. в городе Свердловске (Екатеринбург) получили 11 человек. Именно в эти годы техникум стал выпускать техников-технологов, техников-механиков по производству артсистем и техников-дражников-монтажников (Воспоминания, 2007; Ашихмина, 2007). Похожая история в Воткинске происходила ровно за сто лет до этих событий. В течение 1831–1832 гг. выпускник академии, старший врач заводского госпиталя, доктор медицины и хирургии, статский советник Сильвестр Фёдорович Тучемский (1792–1868 гг.) подготовил на базе заводского госпиталя 19 лекарских учеников, 10 человек из которых после проведённого в Петербурге испытания сразу получили должности фельдшеров (Рашковский, 2014). Но никто не говорит о создании в начале XIX века в посёлке Воткинский завод филиала Медико-хирургической академии Санкт-Петербурга.

Заводчане спроектировали и построили 3 плавучие фабрики-драги увеличенной производительности, способные черпать грунт с глубины до 70 метров. В 1934 году в правительстве страны решили передать драгостроение Иркутскому заводу, а в Воткинске развернуть новое производство с постройкой новой верфи для выпуска землечерпальных снарядов нового типа, в связи с чем дальнейшее развитие высшего образования в Воткинске было приостановлено (Добровольский, 2009: 209).

ИМИ .... имени Баумана

После окончания Великой Отечественной войны перед страной встали новые задачи. Конец сороковых и начало пятидесятых годов ознаменовались бурным техническим прогрессом, в Удмуртии построили десятки новых оборонных заводов и производств. 22 февраля 1952 года глава государства И.В. Сталин подписал постановление правительства Совета Министров СССР № 1034 об образовании высшего технического учебного заведения в городе Ижевске, как одном из крупнейших центров производства изделий машиностроения и стрелкового вооружения (libussr.ru). Ижевский механический институт открыли на базе ремесленного училища № 3 и областного управления трудовых резервов, располагавшихся по улице Горького, 79. Был полностью реконструирован учебный корпус, для размещения профессорско-преподавательского состава в городе были выделены квартиры. Министерство обороны, заводы Ижевска и Воткинский машиностроительный завод передали институту необходимые для обучения приборы, станочное и лабораторное оборудование (Арматынская, 2006a).

С 2012 года ИжГТУ носит имя знаменитого оружейника Михаила Тимофеевича Калашникова, а в первые десятилетия Ижевского механического института к его имени вполне можно было добавлять имя Н.Э. Баумана. Только не за заслуги и личные достоинства молодого революционера, который, не выпустив из рук красного флага, погиб недалеко от главного здания Императорского Московского технического училища (позднее МВТУ), а как института, практически «отпочковавшегося» от Московского высшего технического училища (в настоящее время МГТУ имени Баумана). Институт в Ижевске стал официальным правопреемником лучших академических традиций, сложившихся в главном техническом вузе страны. Министерство высшего образования СССР специальным приказом закрепило шефство МВТУ им. Баумана над Ижевским механическим институтом (ЦГА УР, Ф. Р-1335. Оп. 1. Д. 137. Л. 69-70). Для организации вуза в Ижевск были направлены преподаватели прославленной «Бауманки», имеющие большой опыт ведения научной и учебно-методической работы: деканы, заведующие кафедрами, кандидаты наук и один доктор технических наук, профессор Николай Васильевич Воробьёв. До приезда в Ижевск он был деканом ПТ-факультета МВТУ им. Баумана, а в годы эвакуации университета в город Ижевск в 1941-1943 гг. был одним из преподавателей ижевской «Бауманки» и, параллельно с этой деятельностью, на одном из ижевских заводов он создал лабораторию, которая занималась качеством цепей для боевых машин. В Ижевском институте Н.В. Воробьёв занял пост декана МТ-факультета (Арматынская, 2006b; ИжГТУ).

Директором вуза 28.04.52 года был назначен кандидат технических наук, доцент Владимир Павлович Остроумов, выпускник Тульского механического института и декан артиллерийского факультета МВТУ им. Баумана (ЦГА УР, Ф. Р- 1335. Оп. 1. Д. 1. Л. 19; ИжГТУ). Заместителем директора ИМИ по учебной и научной работе стал кандидат технических наук, доцент МВТУ им. Баумана Виталий Никанорович Журавлев, во время войны он так же в числе эвакуированных преподавателей МВТУ работал в Ижевске (ЦГА УР, Ф. Р- 1335. Оп. 1. Д. 6. Л. 122; ИжГТУ).

1 сентября 1952 года студентов также встречали заведующий кафедрой Теоретической механики к.т.н., доцент Аркадий Андриянович Юркин; заведующий кафедрой Химии к.х.н., доцент Алексей Степанович Воробьев; заведующий кафедрой ОМЛ доцент Иван Максимович Баранов; заведующий кафедрой Высшей математики старший преподаватель Леонид Васильевич Тонков; заведующий кафедрой ИНО старший преподаватель Ирина Константиновна Арнольдова; заведующий кафедрой Физвоспитания и спорта ассистент Анатолий Михайлович Герасимов; ассистент Михаил Израелевич Липкин; ассистент Борис Владимирович Саушкин; ассистент Петр Андреевич Подлевских; ассистент Борис Николаевич Филимонов; зам. директора по АХЧ Т.И. Лежнин; зав. библиотекой А.Г. Оконникова; зав. кабинетом марксизма-ленинизма старший лаборант Н.А. Андреев (ЦГА УР, Ф. Р- 1335. Оп. 1. Д. 6. Л. 1, 44).

До сих пор официально признано, что первый набор студентов на 1 курс ИМИ составил 200 человек (istu.ru). Однако на самом деле это не так. Приказом Министра Высшего Образования СССР № 370 от 4 марта 1952 г. был установлен план приёма на 1 курс дневного отделения 200 человек и на вечернее отделение – 50 человек (ЦГА УР, Ф. Р- 1335. Оп. 1. Д. 1. Л. 10-12). Позднее было решено увеличить первый набор студентов и, согласно приказа МВО

СССР № 1202 от 22 июля 1952 г., он составил 200 человек на дневное и 100 человек на вечернее отделения. Приказом директора Всесоюзного заочного машиностроительного института (ВЗМИ) СССР М.Н. Протасова из учебно-консультационного пункта ВЗМИ в г. Ижевске на 1 курс вечернего отделения ИМИ были переведены две группы студентов: 31 человек были переведены приказом № 324 от 6.09.1952 г. и 13 человек, ранее отчисленных за неуплату за обучение в ВЗМИ, приказом № 457 от 26.11.1952 г. (ЦГА УР, Ф. Р-1335. Оп. 1. Д. 1. Л.116, 172-173, 221).

Требования к студентам нового технического вуза предъявлялись серьезные: после завершения первой сессии были отчислены 4 студента дневного и 1 студент вечернего отделений, а на 2 июля 1953 года на экзаменационную сессию было допущено только 180 студентов дневного отделения (92 чел. на Е-факультете и 88 чел. на МТ-факультете) и 87 студентов вечернего отделения (ЦГА УР, Ф. Р- 1335. Оп. 1. Д. 6. Л. 33, 83-84). Семнадцать преподавателей, включая совместителей и почасовиков, вели обучение студентов по двум специальностям: «Технология машиностроения и машины» (так завуалировано из соображения секретности звучала специальность «Конструирование и проектирование тяжёлых артиллерийских систем») и «Обработка металлов давлением». В течение первого учебного года штат преподавателей постоянно пополнялся за счёт аспирантов и выпускников МВТУ, МАИ, Уральского политехнического института и других вузов страны. К концу первого учебного года в ИМИ работали уже 31 преподаватель, включая совместителей и почасовиков, и 56 человек учебно-вспомогательного и административно-хозяйственного персонала. Пополнялась материально-техническая база института: из МВТУ были привезены мебель для оснащения чертежных и модельных залов, учебные чертежи, с помощью заводов были созданы мастерские: литейная, деревообрабатывающая, модельная, механическая, сварочная. За необходимыми для обучения учебными пособиями был командирован ассистент Б.В. Саушкин: одиннадцать вузов Москвы и Ленинграда, Казанский авиационный институт и Ижевский машиностроительный завод приняли участие в формировании библиотеки Ижевского института. Из 32 тысяч томов, переданных ИМИ безвозмездно, значительную часть (около 7 тысяч томов) выделило Бауманское училище.

Всё первое десятилетие МВТУ имени Баумана курировало работу факультетов Ижевского института: в МВТУ согласовывались учебные планы по специальностям, профессора Московского высшего технического училища оценивали качество выпускников, внося соответствующие коррективы в образовательный процесс. Так, в 1959 году председатель Государственной экзаменационной комиссии Ижевского механического института, д.т.н., профессор МВТУ С.Л. Ананьев отметил, что «дипломные проекты студентов Ижевского механического института в этом году более зрелые», а председатель другой ГЭК, д.т.н., профессор, зав. кафедрой МВТУ А.А. Толочков указал, что «тематика дипломных проектов является очень актуальной, ряд проектов выполнены по конкретным заданиям заводов», и что «выпущенные молодые специалисты показали себя хорошо подготовленными инженерами, способными решать самостоятельно технологические, конструкторские и исследовательские задачи на заводах, в КБ и НИИ» (ЦГА УР, Ф. Р-1335. Оп. 1. Д. 99. Л. 15, 16; Д.77. Л. 139). Официального приказа по прекращению кураторства МВТУ имени Баумана не было, оно сошло на нет как только руководство Бауманки убедилось в стабильно высоком качестве подготовки технических специалистов в течение ряда лет. В 1962 году ректор ИМИ В.П. Остроумов высказался на заседании учёного совета ИМИ о необходимости оживления шефских связей с МВТУ имени Баумана (ЦГА УР, Ф. Р-1335. Оп. 1. Д. 137. Л. 69-70).

Выпускники ИМИ работали не только на Ижевских и Воткинском заводе. В 1959 году Совет Министров РСФСР ввёл порядок распределения молодых специалистов по предприятиям страны, согласно которому выпускники вузов до конца 1980-х годов получали гарантированное трудоустройство, бесплатные квартиры и «подъёмные» – стимулирующую единовременную безвозмездную выплату (ЦГА УР, Ф. Р- 1335. Оп. 1. Д. 92. Л.17-18). Выпускники Ижевского механического института, включая его Воткинский филиал, до конца 1980-х годов получали направления, закрепляющие молодых специалистов на месте назначения для обязательной отработки в течение трёх лет.

Первый филиал ИМИ

В 1953 году на машиностроительном заводе был объявлен набор на подготовительные курсы для поступления в филиал открывающегося в Воткинске института. Однако и вторая попытка открыть филиал института застопорилась. В сентябре 1955 года, благодаря содействию Воткинского горкома партии и директора машзавода Еновка Айрапетовича Гульянца, в Воткинске был открыт учебно-консультационный пункт Всесоюзного заочного машиностроительного института (УКП ВЗМИ г. Москва), работавший при отделе кадров Воткинского машиностроительного завода (ВМЗ). Учебная программа была рассчитана на 3 года. УКП ВЗМИ расположили в здании машиностроительного техникума по ул. Кирова, Руководителем был назначен (по совместительству) Борис Григорьевич Сорокин, завучем – Раиса Михайловна Альбова (Журавлёва). К занятиям приступили 75 работников ВМЗ – выпускников техникума (в то время в техникуме по дневной форме обучались 4 года, по вечерней – 5 лет). Проводили занятия преподаватели техникума, школ города, Ижевского механического института и специалисты завода. Каждый студент-заочник получал бесплатно из Москвы учебные материалы на текущий семестр; раз в полгода организовывались обзорные лекции, читать которые приезжали преподаватели крупных вузов страны, в том числе из Москвы (Метляков, 1983; Кошкаров, 2001).

В 1957 году Воткинский машиностроительный завод был определён ведущим предприятием для выпуска ракет оперативно-тактического назначения, и на завод из Златоуста было переведено производство ракетной техники. В кратчайшие сроки была проведена реконструкция артиллерийских цехов. На тот момент состав инженерно-технических работников Воткинского машиностроительного завода был следующим: 13 % инженеров, 43,9 % техников и 43,1 % практиков (Метляков, 1983).

17 июля 1958 года на базе УКП Всесоюзного заочного машиностроительного института и Воткинского машиностроительного техникума был открыт Воткинский филиал вечернего факультета Ижевского механического института (ВФВФ ИМИ) (ЦГА УР, Ф. Р-1335. Оп. 1. Д. 78. Л. 25-26). Директором был назначен заместитель главного технолога Воткинского машиностроительного завода, выпускник Ленинградского заочного индустриального института Фотей Иванович Метляков 1916 года рождения, неутомимый рационализатор, признанный лучшим технологом Министерства Российской Федерации.

Его заместителем по хозяйственной части утвердили директора Воткинского машиностроительного техникума Николая Платоновича Сыпачева (по совместительству). Н.П. Сыпачеву – 61 год и он имел за плечами огромный опыт организатора учебного процесса в самых сложных условиях. Он был организатором профессионального образования при Ирбитском заводе в Свердловской области, в октябре 1931 года ему была доверена организация ускоренного курса по подготовке инженеров-драгостроителей при Воткинском техникуме, а в 1933-м году директор машиностроительного завода И.В. Иванов назначил его директором машиностроительного техникума. Благодаря кипучей энергии Николая Платоновича двухэтажное здание техникума по ул. Кирова, 3, было реконструировано в течение 1938-1939 гг.: надстроен третий этаж и расширено пристроем по улице Кирова на 4 окна. К 1940-му году в здании появились оборудованные мастерские, учебные и лабораторные классы, просторные актовый, физкультурный и два чертёжных зала. Летом 1941 г. реконструкция была полностью завершена. В подвальном выложенном кирпичом помещении со сводчатыми потолками высотой около двух метров, построенном в середине XIX века, был оборудован тир для студентов (Ларионова, 2019; ВМТ).

За 25 дней лета 1958 года Метляковым и Сыпачевым была проведена вся организационная работа по созданию филиала! Было укомплектовано 9 академических групп студентов с 1 по 4 курс – 198 студентов, 117 из которых были переведены из учебно-консультационного пункта ВЗМИ и 73 человека были отобраны из 115 абитуриентов после экзаменационных испытаний на первый курс (ВФ ИжГТУ, 1958a; ВФ ИжГТУ, 1958b; Метляков, 1983).

Занятия Воткинского филиала вечернего факультета ИМИ проводились по вечерам в свободных аудиториях машиностроительного техникума по учебным программам МВТУ имени Баумана. Основу преподавательских кадров в филиале вечернего факультета ИМИ составили 4 штатных преподавателя филиала (кандидат исторических наук, ст. преподаватель Иван Васильевич Перевощиков, доцент Фотей Иванович Метляков,

ассистенты Нина Алексеевна Морозова и Валентина Павловна Наберухина), 17 совместителей (выпускники вузов А.В. Новожилова, А.Я. Копотева и М.В. Буркова, представители административных органов власти В.И. Подлеских и Л.А. Фёдорова; преподаватели техникума: М.Д. Капусткина, В.Ф. Стрельцов, Л.Н. Столова; специалисты завода: А.К. Рыбаков, Н.Д. Репин, В.П. Головнин, В.П. Юшков, В.И. Сметанин) и преподаватели Ижевского механического института: директор ИМИ (с 1961 года ректор) к.т.н., доцент Владимир Павлович Остроумов; зам. директора ИМИ по научной работе, зав. кафедрой деталей машин и ПТМ, д.т.н., профессор Николай Васильевич Воробьёв; талантливейший математик, к.ф.-м.н. доцент, зав. кафедрой высшей математики Николай Викторович Азбелев (выпускник Московского авиационного института, после окончания аспирантуры в Московском станкоинструментальном институте успешно защитил кандидатскую диссертацию, решив проблему Чаплыгина-Лузина о границах применимости теоремы о дифференциальном неравенстве); к.т.н., доцент Борис Николаевич Шульга (до ИМИ был аспирантом Куйбышевского индустриального института); зам. директора ИМИ по учебной работе, зав. кафедрой теории механизмов, машин и теоретической механики, к.т.н., доцент Владимир Модестович Ястребов (до ИМИ был преподавателем Ленинградского политехнического института); зав. кафедрой технологии машиностроения и технических измерений, к.т.н., доцент Борис Федорович Фёдоров (до ИМИ зам. главного технолога Уралмашзавода); зав. кафедрой сопротивления материалов, старший преподаватель Константин Михайлович Григорьев (до ИМИ выпускник и преподаватель Ленинградского военно-механического института); заведующий кафедрой проектирования радиоаппаратуры, к.ф-м.н. Анатолий Иванович Жаравин; зав. кафедрой проектирования математических счётно-решающих устройств, с 1960 г. зав.кафедрой технологии приборостроения (ТПС) Виктор Борисович Цицинов (до ИМИ выпускник и преподаватель МВТУ им. Баумана); к.т.н, доцент каф. ТМ и ТММ Виталий Никонорович Журавлев (до ИМИ выпускник Ленинградского военно-механического института и МВТУ им. Баумана, преподаватель Академии пром. вооружения) (Метляков, 1983; ИжГТУ). Эти и другие преподаватели ИМИ читали лекции студентам Воткинского филиала, а преподавателям передавали опыт постановки учебно-методической и воспитательной работы. Уровень преподавания в первом филиале ИМИ был задан высокий!

Ижевские преподаватели приезжали в Воткинск на железнодорожном транспорте, ночевали в гостинице ВМЗ, которая находилась на третьем этаже здания, а на следующий день уезжали обратно. Дорога от Ижевска до Воткинска была в те годы грунтовая, непроезжая в дождь и без видимости от клубов пыли в ясную погоду. Лишь в 1974 году появилась автомобильная трасса, связывающая города Ижевск и Воткинск (Метляков, 1983; Воткинская газета, 1999).

В первое десятилетие филиал готовил по заказу Воткинского машиностроительного завода технологов машиностроительного производства, ракетчиков, специалистов по радиоэлектронным устройствам и сварщиков. В филиале начали функционировать курсы повышения квалификации инженерно-технического персонала Воткинского машиностроительного завода (целевого назначения и без отрыва от производства). Работники завода имели возможность обучаться в филиале также и по заочной форме.

Начиная с первых защит дипломных проектов в 1961 году и до 1966 года директор Воткинского машиностроительного завода Владимир Александрович Земцов, как главный заказчик специалистов, лично возглавлял государственную экзаменационную комиссию, в которую входили главные специалисты завода, преподаватели ИМИ и Воткинского филиала ИМИ (ЦГА УР, Ф. Р-1335. Оп. 1. Д. 199. Л. 152, 153). По результатам защит дипломных проектов следовали кадровые решения: выпускников филиала сразу назначали начальниками цехов, отделов, ведущими специалистами производств.

В 1963 году Воткинский машиностроительный завод завершил строительство учебно-производственного корпуса филиала ИМИ, в результате которого здание с пристроем стало занимать целый квартал от улицы Ленина до улицы Кирова. Площадь здания увеличилась с 814 кв. м. до 2800 кв. м., в том числе, учебная – составила 1312 кв. м. Студенты вечернего факультета ИМИ получили дополнительно хорошо оборудованные 15 аудиторий и 10 лабораторий, 9 служебных помещений и кабинеты для преподавателей (ЦГА УР, Ф. Р-1335. Оп. 1. Д. 205. Л. 124, 135). Воткинский машиностроительный техникум выехал из

здания только в ноябре 1977 года в специально построенное для него здание на Втором посёлке по адресу ул. Королёва, 20а.

С первых лет образования вуза в Воткинске началась работа по подготовке своих преподавательских кадров. Были направлены в целевую аспирантуру Сергей Фёдорович Калабин (в 1961 г., научный руководитель к.т.н., зав. каф. ИМИ Владимир Модестович Ястребов), В.Ф. Перевозчиков (в 1962 г. МВТУ имени Баумана), Г.Г. Гайсин (в 1963 г., заочная, научный руководитель зав. каф. Высшей математики ИМИ, д.м.н., профессор Николай Викторович Азбелев), Л.Л. Лукин и А.В. Трухачёв (в 1965 г. ИМИ), Юрий Витальевич Горицкий (в 1966 г. ИМИ) (Метляков, 1983; ИжГТУ). К концу 1964/65 учебного года 13 штатных преподавателей факультета сдали по 1-2 кандидатских экзаменов (ЦГА УР, Ф. Р-1335. Оп. 1. Д. 205. Л. 131-132). В 1965 и 1967 годах прошли первые успешные защиты кандидатских диссертаций, подготовленных в стенах филиала и решающих различные задачи ракетного производства на ВМЗ: Владимира Павловича Коваля, результаты его работы использовались для решения практических задач конструирования и устранения брака при изготовлении серийных узлов, и Сергея Федоровича Калабина, за годы работы в филиале он внёс неоценимый вклад в развитие теории и практики плунжерных планетарных и волновых зубчатых передач (ИжГТУ).

Государственная экзаменационная комиссия 1966 года была создана приказом МВиССО РСФСР № 246-ГК от 23.10.1965 г. Фото И.А. Шиляева, 1966 г. На фото преподаватели Воткинского вечернего факультета ИМИ (слева направо): ст. преподаватель Зиновий Айзикович Майман (стоит слева), ст. преподаватель Салима Исмагуловна Мацак, декан вечернего факультета, доцент Фотей Иванович Метляков. В центре стола председатель комиссии, директор ВМЗ Владимир Александрович Земцов, начальник технического отдела ВМЗ Владислав Мартынович Циунелис, начальник производства ВМЗ Александр Григорьевич Бугай (Рисунок 2).

Рис. 2. Фото И.А. Шиляева, 1966 г.

Воткинский завод до сих пор является одним из важнейших предприятий оборонно-промышленного комплекса России и выпускает высокотехнологичную продукцию, не имеющую аналогов в мире. Воткинский филиал вечернего факультета Ижевского механического института вырос в крупное подразделение ИжГТУ имени М.Т. Калашникова. Преподаватели и аспиранты Воткинского филиала ИМИ-ИжГТУ за эти годы успешно защитили 57 кандидатских диссертации и 11 докторских по разным научным направлениям. В настоящее время 70 % преподавателей имеют научные степени. Если в 1961 году учебный план подготовки специалистов для Воткинского завода включал 32 дисциплины, то в настоящее время он состоит из 75 дисциплин. На начало 2020 года в стенах ВФ ИжГТУ подготовлено 9293 специалиста в области технологии машиностроения, ракетостроения, строительства, экономики и программирования, многие из которых успешно работают главными специалистами в разных областях народного хозяйства, формируя высокий

уровень профессиональной и культурной среды предприятий и организаций. Здесь учились генеральный директор Воткинского машиностроительного завода (1988-1995 гг.) Александр Иванович Пальянов; ректор ИжГТУ имени М.Т. Калашникова (2007-2017 гг.) доктор технических наук, профессор Борис Анатольевич Якимович; генеральный директор ООО «Завод НГО «Техновек» Юрий Николаевич Парамонов; два директора ВФ ИжГТУ: в 2006–2017 гг. доктор технических наук, профессор Александр Валентинович Репко и с 2017 г. кандидат технических наук, доцент Иван Александрович Давыдов.

ИМИ-ИжГТУ открыл ещё 3 филиала в Удмуртии: в 1962 г. в Глазове и Сарапуле, в 1997 г. в гор. Камбарке. Ижевский механический институт за 67 лет деятельности вырос в один из крупнейших технических вузов страны с мощной инфраструктурой и получил статус Ижевского государственного технического университета имени М.Т. Калашникова. Сегодня в структуре университета 12 факультетов, 2 научно-исследовательских института, 21 научно-производственных подразделений и 5 филиалов (в том числе в городе Чайковский Пермского края, открытый в 1992 г.). Работают 61 кафедра и 3 диссертационных совета. В университете обучается более 22 тысяч студентов и аспирантов. Осуществляется подготовка инженеров по 65 специальностям, бакалавров – по 48 направлениям, магистров – по 37 направлениям. Занятия для студентов ведут 105 докторов и профессоров; 396 кандидатов наук и доцентов, специалисты предприятий оборонной промышленности. По версии рейтингового агентства «Эксперт РА» ИжГТУ имени М.Т. Калашникова входит в рейтинг «100 лучших вузов России» (udmpravda.ru; сайт ИжГТУ).

3. Заключение

Проведённый анализ создания профессиональных учебных заведений при Воткинском и Ижевских заводах позволил сопоставить динамику развития профессионального образования от начала XIX века до современности. В посёлке машиностроителей Воткинске (с 1935 года город) ранее, чем в городе (с 1918 г.) оружейников Ижевске открывались учебные заведения с профессиональной подготовкой. Более активное развитие высшего образования в Ижевске было связано с присвоением городу в 1921 году столичного статуса.

Усложнение технологий промышленного производства привело к значительному увеличению срока подготовки специалиста и количества изучаемых дисциплин: от 6 лет и 8 учебных дисциплин в начале XIX века до 16-ти и более лет (включая среднее образование) и более 100 дисциплин к началу XXI века. В наше время работать в высокотехнологичном секторе, каким является современная промышленность, без высшего образования стало невозможным!

Анализ первых лет деятельности Ижевского механического института и первого филиала ИМИ в Воткинске позволяет сделать вывод о значительном влиянии МВТУ имени Баумана на постановку в них учебно-методической и воспитательной работы, что выявляет более глубокую культурную связь ИжГТУ имени М.Т. Калашникова с ведущим техническим вузом страны, чем считалось ранее. Через организацию шефских связей со столичными вузами правительству удалось децентрализовать подготовку качественных кадров для промышленных предприятий Удмуртии. Выпускники Воткинского филиала ИМИ, жители небольшого приуральского города, достигают вершин в карьере, ранее доступных только выпускникам столичных вузов.

В результате исследования были внесены уточнения в официально признанные факты: первый набор студентов на 1 курс ИМИ составил более значительное количество: не 200 человек, а 300; год передачи Воткинскому техникуму здания по ул. Кирова, 3 был 1931-й, а не 1938-й; первым вузом Воткинска является филиал вечернего факультета Ижевского механического института, созданный в 1958 году, и других вузов ранее в Воткинске не было. Представленный список первых преподавателей Воткинского филиала ИМИ, в число которых входили преподаватели ИМИ, включая ректора В.П. Остроумова, показывает изначально высокий уровень постановки учебно-методической и научной работы в филиале, что позволило филиалу ИМИ в течение двух десятилетий полностью решить проблему собственных научных кадров.

Уточнение даты открытия и времени действия вечернего филиала Ленинградского военно-механического института при Ижстальзаводе требует более глубоких исследований.

Литература

Аншаков, 1985 – *Аншаков Б.Я.* Воткинск. Летопись событий и фактов. Устинов: Удмуртия, 1985. 168 с. С. 34.

Арматынская, 2006a – *Арматынская О.* Далеко от Москвы // *Удмуртская правда*. № 124 (24054) от 13.10.2006 года. [Электронный ресурс]. URL: file:///E:/Документы/ОЮ/ИСТОРИЯ%20ИЖГТУ/Удмуртская%20правда.htm

Арматынская, 2006b – *Арматынская О.* Ижевская Бауманка // *Механик*. № 10, октябрь 2006. С. 7.

Ашихмина, 2007 – *Ашихмина О.* Столетняя история // *Трудовая вахта*. От 19 декабря 2007 г. С. 12, 13.

Васина, 2006 – *Васина Т.А.* Камские заводы. Население, культура, быт (конец XVIII – первая половина XIX в.): Монография. Ижевск: Удмуртский институт истории, языка и литературы УрО РАН, 2006. 280 с. С. 107.

ВМТ – Фонды архива Воткинского машиностроительного техникума имени В.Г. Садовникова.

ВОЕНМЕХ – Официальная страница Балтийского государственного технического университета «ВОЕНМЕХ» им. Д.Ф. Устинова [Электронный ресурс]. URL: https://voenmeh.ru/sveden/common/

Воспоминания, 2007 – К столетию Воткинского машиностроительного техникума. Остались только тёплые воспоминания (о преподавателях Л.Н. Столовой и Е.А. Дёмине). // *Воткинские вести*. № 63-64 от 1 июня 2007 г. / Фонды архива музея истории и культуры г. Воткинска.

Воткинская газета – События из истории Воткинска // *Воткинская газета*. № 37 от 17 сентября 1999 г. С. 5.

Воткинский завод, 1999 – Воткинский завод. История развития производства за 240 лет. Ижевск, 1999.

ВФ ИжГТУ, 1958a – Отчёты учебной части, 1958 год. Л. 1, 2. Архив ВФ ИжГТУ имени М.Т. Калашникова.

ВФ ИжГТУ, 1958b – Отчёты директора по новому приёму, 1958 год. Л. 8. Архив ВФ ИжГТУ имени М.Т. Калашникова.

Гаевский, 1998 – *Гаевский Э.И.* Окружное училище // *Воткинские вести*. № 44 (68) от 5 ноября 1998. С. 12.

Добровольский, 2009 – *Добровольский И.А.* Воткинский завод на рубеже эпох (заметки конструктора). Воткинск: МП МИИЦ, 2009. 400 с.

ИГМА – Музей истории Ижевской государственной медицинской академии [Электронный ресурс]. URL: http://www.igma.ru/akademiya/muzej-istorii-igma

ИжГТУ – Личные дела преподавателей из архива Ижевского государственного технического университета имени М.Т. Калашникова.

ИИТ имени И.Ф. Драгунова – Официальный сайт Ижевский Индустриальный техникум имени Евгения Фёдоровича Драгунова [Электронный ресурс]. URL: https://ciur.ru/iit/DocLib16/Forms/AllItems.aspx

Карпова, 2019 – *Карпова Л.И.* Город Воткинск: история в лицах. Том I (1935-1884). УИИЯЛ УдмФИЦ УрО РАН. Ижевск, 2019. 302 с. С. 162.

Кошкаров, 2001 – *Кошкаров В.Г.* Неопубликованные воспоминания студентов 1961 года выпуска, написанные в 2001 г. Архив ВФ ИжГТУ.

Кутявин, 2006 – *Кутявин А.Н.* Автореферат диссертации на соискание ученой степени кандидата исторических наук. «Формирование и развитие системы общего и профессионального образования в Удмуртии второй половины XIX – начала XX века». Специальность 07.00.02 – отечественная история. Ижевск, УдГУ, 2006. [Электронный ресурс]. URL: http://www.netess.ru/3istoriya/186206-1-formirovanie-razvitie-sistemi-obschego-professionalnogo-obrazovaniya-udmurtii-vtoroy-polovini-xix-nachala-veka.php

Ларионова, 2019 – *Ларионова О.Ю.* История здания технического университета в городе Воткинск // Ижевско-Воткинское восстание: сто лет истории. Коллективная монография по материалам докладов конференции «Гражданская война на востоке России (1917–1922 годы): люди, события, факты» Удмуртский институт истории, языка и

литературы; Удмуртский государственный университет. Ижевск: Изд-во «Алкид», 2019. С. 270-280. [Электронный ресурс]. URL: https://elibrary.ru/item.asp?id=39814535

ЛВМИ – Ленинградский Военно-механический институт [Электронный ресурс]. URL: https://dic.academic.ru/dic.nsf/ruwiki/1005632

Метляков, 1983 – *Метляков Ф.И.* Неопубликованная рукопись, подготовленная в 1983 году для книги к 50-летию города Воткинска. Архив ВФ ИжГТУ имени М.Т. Калашникова.

Нельзин, 2003 – *Нельзин А.В.* Школьное образование и трудовое обучение на Воткинском заводе при крепостном праве // *Воткинская мозаика (часть первая)*. Приложение к «Воткинской газете». Воткинск, 2003. С. 112.

Памятная книжка, 1916 – Памятная книжка и адрес-календарь Вятской губернии на 1916 год. С. 233, 240. [Электронный ресурс]. URL: http://elibrary.unatlib.ru/dspace/dsview.html

Пантюхин, 2004 – *Пантюхин Л.А.* ИМИ (ИжГТУ). Факты и судьбы. В 2 ч. 2-е изд., перераб. и доп. Ижевск: Изд-во ИжГТУ, 2004. 240 с. С. 24. [Электронный ресурс]. URL: http://eanbur.unatlib.ru/dspace/dsview.html

Рашковский, 2014 – *Рашковский А.* Выдающийся врач и организатор здравоохранения. Жизнь и судьба доктора Тучемского. ГАКО. Ф. 582. Оп. 1. Д. 32. Л. 3-6; ГАКО. Ф. 582. Оп. 17. Д. 32. Л. 14-17. [Электронный ресурс]. URL: http://blogs.7iskusstv.com/?p=38868

Сайт ИжГТУ – Официальный сайт ИжГТУ имени М.Т. Калашникова [Электронный ресурс]. URL: https://istu.ru/material/ob-universitete

Сорокин, 2003 – *Сорокин И.* Мои наставники. Феномен Давыдова // *Воткинская мозаика (часть первая)*. Приложение к «Воткинской газете». Воткинск, 2003. С. 65-66.

УдГУ – Официальный сайт Удмуртского государственного университета [Электронный ресурс]. URL: http://80let.udsu.ru/history/dates/1931_1941

УрФУ – Официальный сайт Уральского федерального университета имени первого Президента России Б.Н. Ельцина (УрФУ). [Электронный ресурс]. URL: https://urfu.ru/ru/about/history/

ЦГА УР – Центральный государственный архив Удмуртской республики.

Щербаков, 2016 – *Щербаков Б.* Военмех несекретно. Биографии и мемуары. М: Изд-во Знакъ. 2016. 590 с., 256 ил. С. 61. [Электронный ресурс]. URL: https://dom-knig.com/read_187676-61

istu.ru – Историческая справка. Официальный сайт ИжГТУ имени М.Т. Калашникова [Электронный ресурс]. URL: https://istu.ru/material/istoricheskaya-spravka

izhevsk-history.ru – История города Ижевска [Электронный ресурс]. URL: http://www.izhevsk-history.ru/golos/2/13/

libussr.ru – Постановление Совета Министров СССР № 1034 от 22.02.1952. Библиотека нормативно-правовых актов СССР [Электронный ресурс]. URL: http://libussr.ru/doc_ussr/ussr_4845.htm

udmpravda.ru – ИжГТУ: в авангарде науки // *Удмуртская правда*. № 5 (25617) от 8 февраля 2018 г. С. 7. [Электронный ресурс]. URL: http://old.udmpravda.ru/original/Issue/784/original/UP05_08_02_18-1518045231.pdf

votmuseum.ru – Виртуальный музей истории и культуры г. Воткинска [Электронный ресурс]. URL: http://votmuseum.ru/node/147

References

Anshakov, 1985 – *Anshakov, B.Ya.* (1985). Votkinsk. Letopis' sobytii i faktov [Votkinsk. Chronicle of events and facts]. Ustinov: Udmurtiya. 168 p. P. 34. [in Russian]

Armatynskaya, 2006a – *Armatynskaya, O.* (2006). Daleko ot Moskvy [Far from Moscow]. *Udmurtskaya pravda*. № 124 (24054) ot 13.10.2006 goda. [Elektronnyi resurs]. URL: file:///E:/Dokumenty/OYu/ ISTORIYa%20IZhGTU/Udmurtskaya%20pravda.htm [in Russian]

Armatynskaya, 2006b – *Armatynskaya, O.* (2006). Izhevskaya Baumanka [Izhevsk Baumanka]. Mekhanik. № 10, oktyabr. P. 7. [in Russian]

Ashikhmina, 2007 – *Ashikhmina, O.* (2007). Stoletnyaya istoriya [Centennial history]. Trudovaya vakhta. Ot 19 dekabrya 2007 g. P. 12, 13. [in Russian]

Sait IzhGTU – Ofitsial'nyi sait IzhGTU imeni M.T. Kalashnikova [Official website of IzhSTU named after M.T. Kalashnikov.]. [Elektronnyi resurs]. URL: https://istu.ru/material/ob-universitete [in Russian]

Dobrovol'skii, 2009 – *Dobrovol'skii, I.A.* (2009). Votkinskii zavod na rubezhe epokh (zametki konstruktora) [Votkinsk plant at the turn of the era (notes designer)]. Votkinsk: MP MIITs. 400 p. [in Russian]

Gaevskii, 1998 – *Gaevskii, E.I.* (1998). Okruzhnoe uchilishche [District School]. *Votkinskie vesti*. № 44 (68) ot 5 noyabrya. P. 12. [in Russian]

IGMA – Muzei istorii Izhevskoi gosudarstvennoi meditsinskoi akademii [Leningrad military mechanical institute]. [Elektronnyi resurs]. URL: http://www.igma.ru/akademiya/muzej-istorii-igma [in Russian]

IIT imeni I.F. Dragunova – Ofitsial'nyi sait Izhevskii Industrial'nyi tekhnikum imeni Evgeniya Fedorovicha Dragunova [Official site of Izhevsk industrial college named after Evgeny Fedorovich Dragunov]. [Elektronnyi resurs]. URL: https://ciur.ru/iit/DocLib16/ Forms/AllItems.aspx [in Russian]

istu.ru – Istoricheskaya spravka. Ofitsial'nyi sait IzhGTU imeni M.T. Kalashnikova [Historical reference. The official website of IzhSTU named after M.T. Kalashnikov]. [Elektronnyi resurs]. URL: https://istu.ru/material/istoricheskaya-spravka [in Russian]

izhevsk-history.ru – Istoriya goroda Izhevska [History of the Izhevsk city]. [Elektronnyi resurs]. URL: http://www.izhevsk-history.ru/golos/2/13/ [in Russian]

IzhGTU – Lichnye dela prepodavatelei iz arkhiva Izhevskogo gosudarstvennogo tekhnicheskogo universiteta imeni M.T. Kalashnikova [Personal files of teachers from the archive of the Izhevsk state technical university named after M.T. Kalashnikov]. [in Russian]

Karpova, 2019 – *Karpova, L.I.* (2019). Gorod Votkinsk: istoriya v litsakh [Votkinsk city: a story in faces]. Tom I (1935–1884). UIIYaL UdmFITs UrO RAN. Izhevsk, 302 p. P. 162. [in Russian]

Koshkarov, 2001 – *Koshkarov, V.G.* (2001). Neopublikovannye vospominaniya studentov 1961 goda vypuska, napisannye v 2001 g. [Unpublished memoirs of students in 1961, written in 2001]. Arkhiv VF IzhGTU. [in Russian]

Kutyavin, 2006 – *Kutyavin, A.N.* (2006). Avtoreferat dissertatsii na soiskanie uchenoi stepeni kandidata istoricheskikh nauk. «Formirovanie i razvitie sistemy obshchego i professional'nogo obrazovaniya v Udmurtii vtoroi poloviny XIX – nachala XX veka» [Abstract of dissertation for the degree of candidate of historical sciences. “Formation and development of the system of general and vocational education in Udmurtia of the second half of the XIX – early XX centuries]. Spetsial'nost' 07.00.02 – otechestvennaya istoriya. Izhevsk, UdGU. [Elektronnyi resurs]. URL: http://www.netess.ru/3istoriya/186206-1-formirovanie-razvitie-sistemi-obschego-professionalnogo-obrazovaniya-udmurtii-vtoroy-polovini-xix-nachala-veka.php [in Russian]

Larionova, 2019 – *Larionova, O.Yu.* (2019). Istoriya zdaniya tekhnicheskogo universiteta v gorode Votkinsk [The history of the building of a technical university in the city of Votkinsk]. Izhevsko-Votkinskoe vosstanie: sto let istorii. Kollektivnaya monografiya po materialam dokladov konferentsii «Grazhdanskaya voina na vostoke Rossii (1917–1922 gody): lyudi, sobytiya, fakty» Udmurtskii institut istorii, yazyka i literatury; Udmurtskii gosudarstvennyi universitet. Izhevsk: Izd-vo «Alkid». Pp. 270-280. [Elektronnyi resurs]. URL: https://elibrary.ru/item.asp?id=39814535 [in Russian]

libussr.ru – Postanovlenie Soveta Ministrov SSSR № 1034 ot 22.02.1952 [Decree of the Council of Ministers of the USSR No. 1034 of 02.22.1952.]. Biblioteka normativno-pravovykh aktov SSSR [Elektronnyi resurs]. URL: http://libussr.ru/doc_ussr/ ussr_4845.htm [in Russian]

LVMI – Leningradskii Voenno-mekhanicheskii institut [Leningrad Military mechanical institute]. [Elektronnyi resurs]. URL: https://dic.academic.ru/dic.nsf/ruwiki/1005632 [in Russian]

Metlyakov, 1983 – *Metlyakov, F.I.* (1983). Neopublikovannaya rukopis', podgotovlennaya v 1983 godu dlya knigi k 50-letiyu goroda Votkinska [Unpublished manuscript prepared in 1983 for a book on the 50th anniversary of the city of Votkinsk]. Arkhiv VF IzhGTU imeni M.T. Kalashnikova. [in Russian]

Nel'zin, 2003 – *Nel'zin, A.V.* (2003). Shkol'noe obrazovanie i trudovoe obuchenie na Votkinskom zavode pri krepostnom prave [School education and labor training at the Votkinsk plant under serfdom]. *Votkinskaya mozaika (chast' pervaya)*. Prilozhenie k «Votkinskoi gazete». Votkinsk. P. 112. [in Russian]

Pamyatnaya knizhka, 1916 – Pamyatnaya knizhka i adres-kalendar' Vyatskoi gubernii na 1916 god [The memorial book and address-calendar of the Vyatka province for 1916]. P. 233, 240. [Elektronnyi resurs]. URL: http://elibrary.unatlib.ru/dspace/dsview.html [in Russian]

Pantyukhin, 2004 – *Pantyukhin, L.A.* (2004). IMI (IzhGTU). Fakty i sud'by [MI (IzhSTU). Facts and Fates]. V 2 ch. 2-e izd., pererab. i dop. Izhevsk: Izd-vo IzhGTU. 240 p. P. 24. [Elektronnyi resurs]. URL: http://eanbur.unatlib.ru/dspace/dsview.html [in Russian]

Rashkovskii, 2014 – *Rashkovskii, A.* (2014). Vydayushchiisya vrach i organizator zdravookhraneniya. Zhizn' i sud'ba doktora Tuchemskogo [The outstanding doctor and healthcare organizer. The life and fate of Dr. Tuchemsky]. GAKO. F. 582. Op. 1. D. 32. L. 3-6; GAKO. F. 582. Op. 17. D. 32. L. 14-17. [Elektronnyi resurs]. URL: http://blogs.7iskusstv.com/?p=38868 [in Russian]

Shcherbakov, 2016 – *Shcherbakov, B.* (2016). Voenmekh nesekretno. Biografii i memuary [Voenmekh unclassified. Biographies and memoirs]. M: Izd-vo Znak". 590 p., 256 il. P. 61. [Elektronnyi resurs]. URL: https://dom-knig.com/read_187676-61 [in Russian]

Sorokin, 2003 – *Sorokin, I.* (2003). Moi nastavniki. Fenomen Davydova [My mentors. The phenomenon of Davydov.]. *Votkinskaya mozaika (chast' pervaya).* Prilozhenie k «Votkinskoi gazete». Votkinsk. Pp. 65-66. [in Russian]

TsGA UR – Tsentral'nyi gosudarstvennyi arkhiv Udmurtskoi respubliki [Central state archive of the Udmurt republic]. [in Russian]

UdGU – Ofitsial'nyi sait Udmurtskogo gosudarstvennogo universiteta [Official site of Udmurt state university]. [Elektronnyi resurs]. URL: http://80let.udsu.ru/history/dates/1931_1941 [in Russian]

udmpravda.ru – IzhGTU: v avangarde nauki [IzhSTU: at the forefront of science]. *Udmurtskaya pravda.* № 5 (25617) ot 8 fevralya 2018 g. P. 7. [Elektronnyi resurs]. URL: http://old.udmpravda.ru/original/Issue/784/original/UP05_08_02_18-1518045231.pdf [in Russian]

UrFU – Ofitsial'nyi sait Ural'skogo federal'nogo universiteta imeni pervogo Prezidenta Rossii B.N. El'tsina (UrFU) [The Official website of the Ural federal university named after the first President of Russia B.N. Yeltsin (UrFU)]. [Elektronnyi resurs]. URL: https://urfu.ru/ru/about/history/ [in Russian]

Vasina, 2006 – *Vasina, T.A.* (2006). Kamskie zavody. Naselenie, kul'tura, byt (konets XVIII – pervaya polovina XIX v.) [Kama plants. Population, culture, life (end of the 18th – first half of the 19th century)]: Monografiya. Izhevsk: Udmurtskii institut istorii, yazyka i literatury UrO RAN. 280 p. P. 107. [in Russian]

VF IzhGTU, 1958a – Otchety uchebnoi chasti, 1958 god [Reports of the training part, 1958]. L. 1, 2. Arkhiv VF IzhGTU imeni M.T. Kalashnikova. [in Russian]

VF IzhGTU, 1958b – Otchety direktora po novomu priemu, 1958 god [Director's reports on a new admission, 1958]. L. 8. Arkhiv VF IzhGTU imeni M.T. Kalashnikova. [in Russian]

VMT – Fondy arkhiva Votkinskogo mashinostroitel'nogo tekhnikuma imeni V.G. Sadovnikova [Funds of the archive of Votkinsk engineering college named after V.G. Sadovnikov]. [in Russian]

VOENMEKh – Ofitsial'naya stranitsa Baltiiskogo gosudarstvennogo tekhnicheskogo universiteta «VOENMEKh» im. D.F. Ustinova [The official page of the Baltic state technical university "VOENMEH" named after D.F. Ustinova]. [Elektronnyi resurs]. URL: https://voenmeh.ru/ sveden/common/ [in Russian]

Vospominaniya, 2007 – K stoletiyu Votkinskogo mashinostroitel'nogo tekhnikuma. Ostalis' tol'ko teplye vospominaniya (o prepodavatelyakh L.N. Stolovoi i E.A. Demine) [On the centenary of the Votkinsk Engineering College. Only warm memories remained (about the teachers L.N. Stolova and E.A. Demin).]. *Votkinskie vesti.* № 63-64 ot 1 iyunya 2007 g. Fondy arkhiva muzeya istorii i kul'tury g. Votkinska. [in Russian]

Votkinskaya gazeta – Sobytiya iz istorii Votkinska [Events from the history of Votkinsk]. *Votkinskaya gazeta.* № 37 ot 17 sentyabrya 1999 g. P. 5. [in Russian]

Votkinskii zavod, 1999 – Votkinskii zavod. Istoriya razvitiya proizvodstva za 240 let [Votkinsk Plant. The history of the development of production for 240 years]. Izhevsk, 1999. [in Russian]

votmuseum.ru – Virtual'nyi muzei istorii i kul'tury g. Votkinska [Virtual museum of history and culture of Votkinsk]. [Elektronnyi resurs]. URL: http://votmuseum.ru/node/147 [in Russian]

Эволюция профессионального образования при Воткинском и Ижевских заводах в ретроспективе

Ольга Юрьевна Ларионова [a, *], Любовь Леонидовна Нижегородова [b]

[a] Воткинский филиал ИжГТУ имени М.Т. Калашникова, Российская Федерация
[b] Екатерининский лицей, Химки, Российская Федерация

Аннотация. В статье анализируется динамика развития технического образования в Ижевске и Воткинске с начала XIX века до наших дней: от горной школы до университета. Усложнение заводских технологий привело к значительному увеличению срока подготовки специалиста и количества изучаемых дисциплин: от 6 лет и 8 учебных дисциплин в начале XIX века до 16-17 лет (включая среднее образование) и более 100 дисциплин к началу XXI века. Исследование первых лет деятельности Ижевского механического института и первого филиала ИМИ в Воткинске выявило более глубокую их культурную связь с МВТУ имени Баумана, чем считалось ранее. Посредством установления официальных шефских связей ведущего технического вуза страны с вновь создаваемым институтом в периферийном регионе правительству удалось децентрализовать подготовку высококачественных кадров для промышленных предприятий и других отраслей экономики Удмуртии.

Ключевые слова: история Удмуртии, история Ижевска, история Воткинска, Воткинский завод, техническое образование, драгостроение в Воткинске, высшее образование, МВТУ имени Н.Э. Баумана, ИжГТУ имени М.Т. Калашникова, Воткинский филиал ИМИ-ИжГТУ.

[*] Корреспондирующий автор
Адреса электронной почты: olga_lario@mail.ru (О.Ю. Ларионова)

Published in the Slovak Republic
Russian Journal of Sociology
Has been issued since 2015.
E-ISSN 2413-7545
2019, 5(1): 19-45

DOI: 10.13187/rjs.2019.1.19
www.ejournal32.com

Cognitive Advancements and the Growth of Intelligence in History the Cognitive-Developmental and the Psychometric Approaches in Comparison

Georg W. Oesterdiekhoff [a, *]

[a] Karlsruhe Institute for Technology, Germany

Abstract

Populations of different societies differ enormously in their average intelligence scores. Scores of humans from developing countries are lower than those of humans living in advanced countries. Scores of populations of industrialized countries have been continuously growing for more than 100 years. These two groups of phenomena are interconnected to each other. The analysis presented here inserts the psychometric research results, circling around the Flynn effect, into the context of Piagetian cross-cultural psychology. The results of more than 1.000 empirical enquiries, basing on this comparably smaller twin industry, carried out in the past 80 years, have shown that populations of pre-modern societies are staying on preoperational and concrete-operational stages and do not reach the stage of formal operations usually. Only adolescents of modern societies gain the cultural opportunity to develop this stage of abstract thinking. The both leading theories of intelligence, rightly commented, come to the same conclusion referring to the relationship of culture and cognition. Both approaches can support each other. Moreover, the essay combines these insights with notions stemming from ethnology, history, and sociology. The resulting conclusions are helpful to a better understanding not only of mental structures but also of the development of culture and social structures.

Keywords: developmental psychology, stage theory, cognitive structures, cross-cultural psychology, intelligence, Flynn effect.

1. Introduction

This essay aims to accomplish several tasks. First of all, it intends to combine the psychometric intelligence research with the cognitive-developmental approach. The cognitive-developmental approach can help to reach a fuller comprehension of the "nature" of intelligence than the more restricted means of the psychometric tradition allow. Moreover, the cognitive-developmental approach can deliver a better understanding of the fundamentals and implications lying behind the diverging levels of intelligence. Secondly, the essay shows that it is useful to interpret the data stemming from the psychometric tradition as parts of the data the cognitive-developmental approach presents. More exactly, divergent intelligence scores can be understood as parts and dimensions of divergent levels of personality development, usually measured by stage theories that describe the ontogenetic development from infancy over childhood and adolescence to adulthood. Thus, low intelligence scores are a part of more or less childlike anthropological stages, whereas higher scores are manifestations of more mature anthropological stages. Thirdly, the essay tries to deepen the understanding of the relationship between cognition and intelligence

* Corresponding author
E-mail addresses: Oesterdiekhoff@t-online.de (G.W. Oesterdiekhoff)

on the one side and culture and history on the other side. It wants to illuminate the impact of intelligence or cognitive stages on culture and history, the influence of diverging scores or cognitive structures on different cultures. The cognitive-developmental approach respectively the Piagetian cross-cultural psychology (PCCP) delivers the key to base disciplines called Historical Anthropology, Historical Psychology, mentality research (in the historical disciplines) and micro-sociology (in social sciences). It provides the deepest notions about "humans", about humans in history, about human development in different cultures, about thinking, worldview, and behavior in pre-modern and modern societies. Forthly, in the past 30 years, I developed a theory program called "structural-genetic theory program" that intends to apply the empirical results of the cognitive-developmental approach respectively of the PCCP to social sciences and humanities, basing on ten books and numerous articles in the meantime. I showed that the history of humankind, the history of economy, culture, law, sciences, philosophy, religion, morals, and customs needs to be reconstructed on the basis of the cognitive-developmental approach. For example, the prevalence of magic, superstition, theology, and irrational customs in pre-modern societies stem from lower forms of cognition, whereas the rise of higher stages of cognition and intelligence accounts for the evolution of modern sciences, age of enlightenment, the humanitarian revolution, democracy and industrial society in the past 300 years. Thus, divergent levels of intelligence and psyche have played a much bigger role in constituting human´s history than usually assumed. Fifthly, these notions are crucial in basing several humanities, ranging from sinology and Egyptology over ethnology and archaeology to history, economy and sociology. The notions these disciplines have procured in their long history have to be referred to the knowledge the PCCP respectively the structural-genetic theory programme has accumulated and then have to be corrected or modified against this new background.

2. Discussion

The historical links between the two paradigms

One hundred years ago, the links between psychometric intelligence research and developmental psychology were more close than today. For example, William Stern was an important father of German developmental psychology and intelligence research as well. Jean Piaget, the worldwide most influential developmental psychologist so far, started his career under the direction of Simon in the laboratory of Alfred Binet in Paris in 1919. The work with intelligence tests induced him to develop his stage theory because he wanted to understand the systematically wrong answers of children and the related phenomenon of rising intelligence in ontogenesis (Piaget, 1976: 24-26).

However, in the following decades the links between these two paradigms weakened increasingly. Developmental psychology largely remained a child psychology, and intelligence research surmounted or lost its adherence to the broader frame and deeper fundamentals of developmental psychology. Intelligence research tried to isolate "intelligence" as a separate, independent, and closed phenomenon, something that is reducible to the capability to reason. Despite of the largely separated and divergent paths of both approaches there were some researchers who still have been emphasizing their correspondences during the whole past century. Though, they mainly worked out this link by comparing and applying the tests of both traditions, especially by inserting Piagetian test procedures in those known in the psychometric tradition. Usually, they overlooked the possibilities the cognitive-developmental approach could offer to frame and to interpret the phenomenon "intelligence". Among the researchers who tried to integrate the two traditions were, for example, Tuddenham (1969), Demetriou, Efklides (1987), Vernon (1969), Freitag (1983), Gustafsson, Undheim (1996), Sternberg, Rivkin (1979), Mogdil, Mogdil (1976, vol. VIII: 59 f), and Case, Demetriou, Platsidou, Kazi (2001).

The comparison between the two paradigms is interesting especially with regard to their respective cross-cultural empirical results. Both approaches discovered specific connections between intelligence or cognitive stages on the one side and culture on the other side. Against the results of both theories, pre-modern populations stay on lower stages of cognition and intelligence, whereas populations, living in modern societies, are characterized by higher scores or stages. James Flynn recognized as late as 2001 that the rise of intelligence is real and not a methodological artefact, as he used to believe the two decades before (Flynn, 2006; Flynn, 2007; Flynn, 2008). However, this insight alone does not procure a full understanding of that what happened in history with man´s intelligence and psyche.

The empirical surveys of PCCP of the past 80 years hint to a parallel conclusion, hardening, deepening, and verifying the results circling around the "Flynn effect". The evolution of the adolescent stage of cognition and psyche, the stage of formal operations, is bound to populations of modern societies only, whereas populations of pre-modern societies remain bound to pre-operational or concrete operational stages (Dasen, Berry 1974; Dasen, 1977; Freitag, 1983; Eckensberger, 1979; Poortinga, 1977; Schöfthaler, Goldschmidt, 1984; Luria, 1982; Hallpike, 1979; Oesterdiekhoff, 1997–2020). Thus, the historical evolution of formal operations corresponds to the growth of intelligence. Additionally, both paradigms evidence that the rise of modern school systems and curricula, among many other features of modern cultures, has the biggest stake in causing the increase of intelligence and the origination of formal operations respectively the adolescent anthropological stage (Oesterdiekhoff, Rindermann 2008). Thus, the cross-cultural intelligence research, especially the phenomenon of rising intelligence, the Flynn effect, needs to be embedded in the context of PCCP and structural-genetic theory programme. Then it is possible to reach a better understanding of divergent intelligence levels of different populations and of the connections between psyche and intelligence on the one side and culture and history on the other side.

Culture and intelligence: the empirical results of the psychometric approach

According to Barber (2005: 280), the populations of the listed world regions have following intelligence scores: Europe (25 nations) 97.48, Africa (17) 70.82, Asia (20) 91.50, North and South America (15) 87.13, and Oceania (4) 92.25. According to Lynn (2006), the average IQ of Eastern Asians is 105, of Europeans 99, of people from India and North Africa 84 each, of people from Black Africa 67, and the IQ of the Khoisan amounts only 54.

However, these data have only a historical or contemporary nature, not a static, eternal, and invariable status. They only reveal the present intelligence level of contemporary generations. The research knows about these populations changes of scores over time and over succeeding generations. The phenomenon of rising intelligence is liable to all continents and world regions, liable to many populations, namely to all those, whose living conditions came under modernization pressure. There must be a strong correlation between the causes behind the phenomenon of rising intelligence, known as Flynn effect, and the IQ differences between different populations (Nijenhuis, 2012).

For example, the IQ of the Chinese in their mother country rose from 1936 to 1986 considerably. They gained 22 points on the Raven Progressive Matrices test (Flynn, 1998: 49). Japanese and Chinese in their respective mother countries had around 1920 an IQ of 77 and 70 respectively, according to the British standard of that time, which was lower than today (Luria, 2002: 42; Sowell, 1994: 160). Children aged 6 to 15 gained 20 points on the Wechsler test in Japan between 1951 and 1975 (Flynn, 1987: 172-182). The IQ of Chinese and Japanese living in North America was below that of the Whites in the Sixties and Seventies of the past century, according to the conclusions of James Flynn (1991), basing on his reanalysis of eleven leading surveys carried out in the US. According to them, their non-verbal mean IQ was in the 94-101 range, and their verbal mean IQ in the 90-95 range. However, by the end of the 20th century, Eastern Asians became more and more successful and outperformed most other ethnic groups, no matter whether they lived in their original countries Japan, China, Korea, or Taiwan, or as immigrants elsewhere. Although they are at the moment not superior to white Europeans and North Americans in verbal ability, they have surpassed them now in most other intellectual skills (Lynn, 2006; Lynn, Vanhanen, 2002; Chan, Vernon, 1988: 352; Iwawaki, Vernon 1988: 375). Eastern Asians had lower scores than white Europeans or Americans 50 and 100 years ago, but nowadays the opposite is true, however, not to the same rate. The Eastern Asians had lower scores than their White counterparts at least during the first half of the 20th century and also still somewhat later, but the White people of that time had lower scores than their White descendants and Eastern Asians at present as well.

The scores of the Russians rose tremendously during the era of communist modernization (Vernon, 1969: 16, 232). The IQ, measured by Raven´s Matrices, increased by 18 points in Argentina from 1968 to 1998 and in Israel from 1954 to 1984.

The phenomenon of rising intelligence is also observable among Black people in Africa and America. The evidence for the rise of scores among American Blacks goes back at least to 1909

(Huang, Hauser, 1998: 319). During World War I, Blacks from the more developed North of the US scored 90, from the South 80. At that time, black soldiers from Ohio, Illinois, New York, and Pennsylvania scored higher than white soldiers from Georgia, Arkansas, Kentucky, and Mississippi. Black orphans adopted by white families had a mean IQ of 106 (Scarr, Weinberg, 1976; Sowell, 1994: 167). In 1980, Blacks in the United States reached the IQ level of the Whites in 1930 (Neisser, 1998b: 5). A new trend of rising scores among US-Blacks came into being especially after 1965. Between 1970 and 1985 alone, the Black-White gap in reading competence decreased by about 50 %, in maths by 25-40 %, and in science by 15-25 %. The gap amounts today still for some points only (Hauser, 1998: 220; Grissmer, 1998: 251, 263). The Black-White IQ difference is comparable to corresponding differences between Catholics and Protestants in Northern Ireland or Jews from Western and Eastern Europe in Israel, measured about 40 years ago (Smooha, 1978: 162; Eysenck, 1971: 123; Sowell, 1994: 160; Vernon, 1969: 74).

The phenomenon of rising intelligence among white Europeans goes back to the first days of intelligence measurement. John Raven, the son of J.C. Raven, who invented the Raven´s Progressive Matrices, calculated the Briton´s growth of intelligence since the 19th centuries. He took the test scores of persons who were between 25 and 65 years of age in 1942 and compared them to persons who were between 25 and 65 years of age in 1992. This data basis enabled the researchers to analyse and to compare persons born in the long time span between 1877 and 1967. According to the valid adjustment of intelligence scores in 1992 (with Raven´s Matrices) the scores of 90 % of the Britons born in 1877 are falling under the IQ-level of 75 that is under the level of the weakest percentages of those who were born in 1967. The rise of the intelligence concerns the total population and does not consist only of improvements in the weaker groups. The percentages with the highest IQ in the 19th centuries would be the percentages of today´s bottom level. The groups of 18-32 years of age attained a rise of at least 20 points over the last 100 years, those between 33-67 years of age gained a rise of 30 points (Raven et al., 1993).

Storfer (Storfer, 1990: 89ff) found similar results in the USA. During World War I, the intelligence of US-soldiers had been systematically measured. While soldiers with German, English or French origins attained scores above 100 (mean score of US-Americans), soldiers stemming from Southern and Eastern Europe reached scores only within the eighties. Immigrants, being tested during World War I, from the Baltic countries, the Balkan, Poland, Russia, Greece, Italy, Spain, and Portugal had mean scores around 80 (Sowell, 1994: 159; Molnar, 2002: 283f). In those days, these scores were characteristic to the IQ of inhabitants of the Eastern and Southern European Countries. These immigrants reached scores of about 55, compared to present-day adjustments. White US-Americans attained a rise of 25 points between 1918 and 1995 (measured by the Wechsler-Binet-test). Compared to 1992, the white US-Americans therefore had an average IQ of 75 in 1918 (Flynn, 1998: 36f). But the immigrants of Eastern and Southern Europe scored about 20 points below that level. These low scores of 50 to 60 points are nowadays typical for the weakest countries in Black Africa.

The IQ of immigrants from England, France, and Germany was above 100 in the USA during World War I, while the IQ of immigrants from backward Southern and Eastern Europe was below that value. 67 % of US-soldiers from England attained scores over 100, so did 49 % of the Germans, but only 26 % of the Irish, 19 % of the Russians, 14 % of the Italians, and 12 % of the Polish people serving in the army (Sowell, 1994: 162). The low performance of these ethnic groups refers to a fact that the psychologist H. H. Goddard explained in 1913 this way: “These people can not deal with abstractions.”.

The tests carried out in World War II revealed that the IQ of US-soldiers had risen for 13 points in the time span of about 25 years between the two wars (Tuddenham, 1948). The IQ of US-citizens of Italian origin was 92 during the third decade of the past century; it rose to 95 in the forties, and to 100 in the seventies. The IQ of US-citizens stemming from Poland was measured with 91 in the third decade, grew to 99 in the forties, and reached 109 in the seventies (Sowell, 1994: 166). The rise of the IQ of the Jews of Eastern Europe is most impressing. Most of the Russian and Polish immigrants had been Jews, measured with scores of around 80 at Ellis island, about 1910. Within a few decades they succeeded in attaining average scores of about 115 (Pintner, 1931: 453; Sarich, Miele 2004: 231). White US-Americans, living in remote rural areas, continued to score with around 85 (Sowell, 1994: 163).

While the IQ of US-Americans rose between 1918 and 1995 for about 25 points (in the above mentioned tests), to the same amount as the IQ of British people rose from 1877 to 1992, the IQ of people from Eastern and Southern Europe increased for about 40 points in the past 100 years. Today, there are no big IQ differences left within white people in Europe, whether they may live in Western, Eastern, or Southern Europe (Irvine, Berry, 1988; Lynn, Vanhanen, 2002; Lynn, 2006).

The biggest push of intelligence seems to have taken place in the time span between 1945 and 1990, with regard to both Americas, Europe, Russia, Japan, China, and some other world regions. West German children aged 6 to 15 gained 20 points on the Wechsler test between 1954 and 1981. On Raven´s Matrices tests, the IQ of Dutch conscripts rose by 21 points between 1952 and 1982. Between 1949 and 1974 the French achieved a gain of 25 points on the Raven test, and 9 points in maths and vocabulary (Flynn, 1987: 172-182). That was the time span when the scores of the Russians, Japanese, Chinese, Koreans, and Americans increased, too.

The proper interpretation of the data induces a clear pattern. A century ago, the higher IQ of the British people, compared to that of US-Americans, French and German immigrants to the US, was bound to the advance of modernization in England at that time. The IQ advance of almost 20 points, British, French, and German immigrants had, compared to the immigrants of Southern and Eastern Europe, completely lies in the context of this connection between the levels of intelligence and modernization. A century ago, the four advanced countries had developed high levels of industrialism and had built up a school system encompassing more or less the whole population. But the other backward European countries were characterized by low levels of modernization and education (Oesterdiekhoff, 2005; Flynn, 2007). Consequently, after World War II, the later modernization of Eastern and Southern Europe caused the rise of their populations´ IQ. The same is true with the rest of the world that came under modernization pressure.

This fact fits the phenomenon called the Flynn effect that describes the steady rise of IQ of all populations from industrialized countries during the past 100 years. The rise of IQ started more or less with the beginning of industrialization and modernization in the 19th centuries, according to a widespread opinion (Meisenberg, 2006; Flynn, 2006, Flynn, 2007; Neisser, 1998b; Oesterdiekhoff, 2006; Oesterdiekhoff, 2009a + b; Oesterdiekhoff, 2011a, Oesterdiekhoff, 2012 a + b).

Britons, French, Germans, and North Americans had lower scores (20 to 30 points) one hundred years ago than today. But Chinese, Japanese, Russians, Eastern and Southern Europeans, Black Africans, Black Australians, and other ethnicities were even still below that level (again 20 to 30 points), as the measurements of that time had revealed. This implies, that this non-Western group of backward populations, including Italians, Greeks, Chinese, and Russians, had scores around 50, compared to present measurement standards. Such scores around 50 are typical for populations of the weakest countries in Black Africa of today. The IQ of Indians of North and South America, Australian Aborigines, Khoisan and other Black ethnic groups, and pre-modern Europeans and Asians typically are falling in the range of 50 to 70 (Irvine & Berry 1988; Lynn & Vanhanen 2002; Lynn 2006; Vernon 1969; Maistriaux 1955; Biesheuvel 1943; Porteus 1937; Luria 2002). These scores are measured in this range when the peoples of these cultures didn´t stand much or not at all under modern influences. This is the result of thousands of studies carried out in the last 130 years since the days of Francis Galton. Therefore, all pre-modern populations must have been characterized by very low scores in the whole history of mankind, in all cultures and ethnic groups around the globe.

According to present standards, more than 90 % of the Britons born in 1877 had an IQ of under 75 (Raven et al. 1993). 90 years ago, Eastern and Southern Europeans showed IQ scores of more or less 50, compared to present standards. Against the background of these and other data and considerations we have to assume that even the people of Northwest Europe had such low scores before the beginning of industrialization and modernization in the 17th and 18th centuries. We come to the conclusion that the French, English, and Germans had IQ scores of less than 75 in the 18th century, scores comparable to those of non-European peoples of pre-modern societies around the globe. The calculations of Raven, won among the globally most advanced country one 100 years ago, do not allow any other consideration. The intelligence of the Britons born in 1877 has the same historical nature as the intelligence of all the other groups mentioned. The hint to the high standard of school education in England (and France, Germany, and the USA) at that time suffices to evidence the historical nature both of the British values mentioned and of the superiority of these Western populations compared to all other populations. The connection between low

intelligence and pre-modern social structures (especially illiteracy) on the one hand and higher intelligence and modernity (especially literacy and modern curricula) on the other hand concerns all populations (Luria, 2002; Vernon, 1969: 42, 219, 232; Barber, 2005: 275; Klich, 1988: 433f; Oesterdiekhoff, 1997; Oesterdiekhoff, 2000; Oesterdiekhoff, 2006; Oesterdiekhoff, 2009a; Oesterdiekhoff, 2009b; Oesterdiekhoff, 2011a; Flynn, 2007). Whereas the Eastern Asians had lower scores than Western Europeans one 100 years ago, they nowadays have usually higher scores, although the recent generations of Europeans raised their scores tremendously, too! The extremely severe school system in Asia seems to be the most decisive factor to the prime position of Eastern Asian people regarding the last decades (Flynn, 1991; Flynn, 1998: 49). Accordingly, test psychologists saw in the bad schools in China 50 years ago the main cause for the weak results of the Chinese in Piaget tasks and intelligence tests as well (Goodnow, Bethon 1966: 573ff).

It is quite clear that, in the minds of some laymen or critics, these facts can arouse doubts upon the reliability and utility of intelligence measurements at all. However, this difficulty to interpret concerns even the best experts. It is by no chance that James Flynn as late as 2001 acknowledged that the low scores of deceased or pre-modern populations are real and not methodological artefacts. Low scores up to 75 usually are indicators of mental handicaps – how could ancient populations then master their lives when outfit by these low levels? Ethnologists, psychologists, and sociologists before World War II often had no problems to attribute to the so-called primitives low forms of intelligence. But nowadays (since about 1970) the ideologies both of the "cultural relativism" and of the "intellectual unity of mankind" dominate more or less within all humanities and social sciences. Does it mean that the phenomenon of low intelligence of pre-modern populations verifies the ideas of older generations of scholars concerning the childlike psyche and intelligence of ancient man? "If we project IQ gains back to 1900, the average IQ scored against current norms was somewhere between 50 and 70. If IQ gains are in any sense real, we are driven to the absurd conclusion that a majority of our ancestors were mentally retarded." (Flynn, 2007: 9f) But the gains are real, according to his own opinion held since 2001. As long as psychologists understand the Flynn effect as an anomaly they have no possibility to understand both the nature of intelligence and rising scores as well. The Flynn effect, respectively the current interpretation of the history of man´s intelligence, seems to verify leading theories of the humanities developed in the time span 1800–1970.

The problem is by no means solved when we identify the causes of rising intelligence in changes of education, nutrition, media, and occupation. The research needs to focus the nature of (low and rising) intelligence scores and the implications of this phenomenon. Before I start the discussion about the causes and the nature of intelligence, basing on the psychometric tradition, I want to present the data won by the PCCP. These data help to gain a better understanding of the psychometric research. Afterwards, I will resume the discussion mentioned. The reference to data about pre-modern populations won by research basing on developmental psychology, namely on Jean Piaget and Alexandr Luria, has supported James Flynn in his understanding of the real nature of the growth of intelligence. "I want to say that Georg Oesterdiekhoff brought a Piagetian interpretation of the past to my attention." (Flynn, 2007: 82). Correspondingly, his book is now full of hints to the Piagetian cross-cultural results that support his "hard" interpretation of the psychometric data concerning the low intelligence of pre-modern populations. However, his position is only harder than previously; it is not really hard, as the quotation in the previous section already indicates.

Developmental psychology

Developmental or child psychology is not only a theory of intelligence and cognition but a theory of the overall development of psyche and personality. It describes the development of the human being from infancy over childhood and adolescence to adulthood. It discloses the growth of intelligence and cognition as parts of the growth of personality, as parts of the ontogenetic development of the human being. The ultimate cause to the ontogenetic development of psyche and personality, including cognition and intelligence, is the physiological development of the brain. It needs a time span of roughly two decades to attain its mature status (Piaget, Inhelder, 1969; Case, 1999; Bühler, 1930; Werner, 1948; Kohlberg, 1974).

Jean Piaget, following especially James Mark Baldwin, has delivered the most elaborated description of ontogenetic development. He divided, as his American forerunner did, the

ontogenetic development into four stages. The purely practical and visual intelligence of the suckling characterizes the sensory-motor stage, encompassing the first 18 months of life. The child of the second stage, the preoperational stage, develops language, reasoning, memories and anticipations, those capabilities, which separate humans from animals. The third stage, the stage of concrete operations, originates the possibilities to logical co-ordinations and classifications of objects, when they are given to the senses. Among humans of modern societies, this stage unfolds stepwise between their sixth and tenth year of age. The forth and final stage, the stage of formal operations, develops gradually between the tenth and twentieth year of age. Reflexive, abstractive, experimental, combinatorial, and hypothetical-deductive reasoning routines and capabilities shape this stage of adolescent thinking (Piaget, 1950; Piaget, Inhelder, 1969). This stage, which bases the overall adolescent development of personality, is bound to humans of modern societies only, as I will disclose and evidence below.

Developmental psychology and stage theory have described that humans attaining higher stages establish new structures of personality and psyche and overcome the older ones. On each different stage humans gain new forms of experiencing and interpreting the inner and outer world, the psychological, physical, social, and moral world. Thus, developmental psychology does not only describe the growth of intelligence but also the evolution of the material understanding of the world. Humans on different psycho-cognitive or anthropological stages have different capabilities and understandings of logic (such as deduction, inference, classification, number), of categories (such as causality, chance, probability, possibility, necessity), of physics (such as mass, volume, length, space, time, weight), of social relations (such as perspectives, interactions, self-awareness, empathy), and morals (such as rules, responsibility, intentions, punishment, shame).

A stage is a structure defined to lower and higher stages as well. A stage is something like a cognitive cage: persons on a certain stage cannot restore the overcome structures and do not provide about the higher stages. Humans on different stages are different kinds of humans; therefore, they are standing on different anthropological stages.

It is impossible to give here an overview on these facts. Therefore, I will present here only some phenomena to illustrate these coherencies. The difference between sensory-motor and preoperational stages is self-evident on the first glance: The rise of language in the second year of life suffices to evidence the evolution of the second stage. I will describe only one experiment, among hundreds known, namely the test regarding the conservation of volumes, to demonstrate the evolution of the third stage, the stage of concrete operations. Children of four years of age understand that the amount of water in two equal glasses with the same water levels is really identical. When the content of one of the glasses is poured into a longer, but smaller glass, then the child on the preoperational stage believes that the amount of water has changed. His common answer is that the volume has increased. When the child, however, gives the right answer, then this is an indicator to his attainment of the concrete operations. The narrow range of attentiveness, the inability to focus simultaneously several aspects, and to compensate the observable impressions by considering all dimensions (length, width, height) account to the non-preservation of volume. The preoperational child´s thinking is static and irreversible: It cannot go back to the start of the action to compare the beginning and the result of the pouring. Concrete operations, however, base on reversibility, on the simultaneity of the consideration both of aspects of objects and parts of action (Piaget, Inhelder, 1941; Piaget, 1950; Petter, 1975; Mogdil, Mogdil, 1976).

I will present two examples for the formal operations, one, which describes their initial origination (sub-stage A) and one that characterizes sub-stage B. Children on the concrete level do not master *logical deductions* such as syllogisms but only *empirical deductions*. The mastering of syllogism demands to combine sentences logically. Two sentences have to be linked in order to find the solution, of which the first sentence (“precious metals do not rust”) has the nature of a general judgment and implies the major premise, while the second statement (“gold is a precious metal”) comprises as a particular statement the minor premise. Children in their first decade of life all over the world don´t find the right solution that gold as a precious metal doesn´t rust. The more complicated, contra-intuitive syllogisms, can be solved only by older teenagers and belong to sub-stage B (Schröder, 1989). The colour or the pendulum task also belong to sub-stage B because they provide experimental and combinatorial controls. In the pendulum task subjects are given two different weights and two ropes with different lengths. The only way to find the relevant factor that accounts for the amount of oscillation is to isolate one factor against all others. Only systematic

experiments, only the combination of all factors, can evidence the length of the rope as the single factor (Piaget, Inhelder, 1958).

I just mentioned three tasks among several hundreds used to describe stage development, intellectual capabilities, and their mental implications and behavior consequences. Children in modern societies unfold regularly the concrete operations between their sixth and their tenth year of life, sub-stage A of formal operations between their tenth and fifteenth year of life and sub-stage B in the following years (but only 30-50 % of modern youths attain B). These three examples can only offer a small hunch of the insights into the different mental worlds of humans on different stages developmental psychology has procured. Persons on different psycho-cognitive or anthropological stages live in completely different worlds and have different resources to think and to act available.

Piagetian cross-cultural psychology

The cross-cultural application of Piagetian stage theory started roughly 1932 and had its peak more or less between 1960 and 1990. More than 1.000 tests were applied to hundreds of ethnicities, milieus, classes, and age groups on all continents. The first conclusion is that even exotic ethnicities react to the tests and can be measured. Stage theory really describes the universal human development from infancy to adulthood. „It was found that the responses and explanations given by the Aboriginal children could be classified without difficulty into the stages described by Piaget.“ (Dasen, 1974b: 395) “Whenever Piagetian tests are applied in non-Western cultures, the same stages as those originally described by Piaget are found, but the rate of development is usually affected by environmental influences.” (Dasen, 1974b: 381) This universality results from the general trend stemming from the maturation of brain and mind during ontogenesis. Different cultures nevertheless affect this biological-psychological development, largely by determining the final stage humans can achieve. Different populations have different possibilities to climb the ladder, to reach higher anthropological summits respectively psycho-cognitive stages.

Humans in modern societies always complete the concrete operations and reach sub-stage A of formal operations. However, only 30-50 % acquire sub-stage B (Schröder, 1989: 204f; Mogdil, Mogdil, 1976, vol. III: 149). In France, for example, there was an increase in attaining sub-stage B from 1967 to 1996 (Flynn, 2007: 31). This implies that the anthropological summit or the developmental age of modern humans distribute more or less between 12 and 20. All humans of pre-modern societies develop the sensory-motor and the preoperational stages the way stage theory predicts. But the stage of concrete operations develops with a time lag of some years or not at all. It is developed only by a lesser or greater proportion of pre-modern populations and even then only in specific domains. With regard to the above-mentioned test on the conservation of volume it is usual among pre-modern populations that only certain percentages reach the stage of concrete operations. This test alone has been replicated some hundred times among all sorts of ethnicities and milieus around the world. The percentage of “preservers” distribute between 0 and 100 % of adult humans, depending on the culture tested. For example, Patricia Greenfield found that 50 % of the illiterate adult Wolof from Senegal did not master the conservation of volume, whereas the literate adults succeeded all. Thus, she concluded with regard to the developmental age of the illiterate Wolof: “That experiment and this one suggest that, without school, intellectual development, defined as any qualitative change, ceases shortly after age nine.” (Greenfield, 1966: 234).

All other surveys on concrete operations in pre-modern societies hint to the same point and allow the same far reaching conclusions on the stop of qualitative cognitive changes among illiterate people across all cognitive tasks whatever questioned. The research showed that, for example, in a certain population 30 % of people may master task 1, 50 % task 2, 0 % task 3, 70 % task 4, etc. Therefore, pre-modern populations are usually asymptotically divided in preservers and non-preservers. Thus, pre-modern populations master this third stage only partially. There are tribes with nearly absent concrete operations and others with certain percentages of “preservers”, but then limited to specific domains and contents. For example, while residents of deserts regularly preserve lengths and spaces but not volumes and weights, the reverse is seen among village dwellers (Dasen, 1984). However, in either case only certain percentages reach the concrete operations.

Adults from hunter and gatherer bands, from illiterate pre-modern peasant societies, from backward regions in developing countries do not develop the formal operations at all. The incomplete development of the concrete operations and the total lack of formal operations are

deeply connected. The less intelligent part of such populations does not acquire neither concrete nor formal operations. The more intelligent part is just able to perform the concrete operations, at least partially, but fails at all in reaching the formal stage. The asymptotic development of concrete operations and the total lack of formal operations belong together (Dasen, 1974a, Dasen, 1974b; Dasen, 1977; Eckensberger, 1979; Freitag, 1983; Greenfield, 1966; Kohlberg, 1974; Mogdil, Mogdil, 1976, vol. 8; Poortinga, 1977; Schöfthaler, Goldschmidt, 1984; Werner, 1979; Flynn, 2007; Vernon, 1969; Hallpike, 1979; Oesterdiekhoff, 1997–2020).

Dozens of authors have recognized that these are the main findings of PCCP and have drawn some relevant conclusions. "According to this evidence, it can no longer be assumed that adults of all societies reach the concrete operational stage. However, the cross-cultural differences summarized above are quantitative ones only. It is the rate of development which is in question, not the structure of thinking. As such, the generality of Piaget´s system is not threatened." (Dasen, 1974a: 418) "In particular it is quite possible (and it is the impression given by the known ethnographic literature) that in numerous cultures adult thinking does not proceed beyond the level of concrete operations, and does not reach that of propositional [formal] operations, elaborated between 12 and 15 years of age in our culture." (Piaget, 1974: 309) Moreover, in many or most of his books Piaget wrote that the primitives do not even acquire the concrete operations but remain bound to the preoperational stage. "However, formal operational thinking is apparently absent in many world cultures..." (Chapman, 1988: 98) "En numerosas investigaciones epistemológicas, Jean Piaget ha senãlado las ´analogías´ entre las concepciones cognitivas y morales de las sociedades primitivas y el pensamiento en las fases iniciales de la ontogénesis. Según él los niveles del desarrollo ontogenético, del pensamiento matemático-lógico, así como de las categorias elementales del conocimiento o de la moral, se pueden encontrar en el desarrollo histórico de la especie humana." (Ibarra, 2007: 13)

For example, the so-called primitives usually do not master syllogisms and other forms of logical deductions, Piaget discovered only among modern teenagers but not among children. Alexandr Luria was in 1932 & 1933 one of the first to describe these particularities. His book on the Kashgar people of Usbekistan was a milestone of cross-cultural research.

"Subject: Abdurakhm, age thirty-seven, from remote Kashgar village, illiterate.

Question (Q): Cotton can grow only where it is hot and dry. In England it is cold and damp. Can cotton grow there?

Answer (A): I don´t know it.

Q: Think about it.

A: I´ve only been in the Kashgar country: I don´t know beyond that...

Commentary: Refusal; reference to lack of personal experience.

Q: But on the basis of what I said to you, can cotton grow there?

A: If the land is good, cotton will grow there, but if it is damp and poor, it won´t grow. If it´s like the Kashgar country, it will grow there too. If the soil is loose, it can grow there too, of course.

Commentary: Both premises ignored, reasoning conducted within the framework of conditions advanced independently." (Luria, 1982: 108)

Luria found the same explanations to the failure of the adults as Piaget himself had given with regard to children. The Luria following research reported the same phenomenon with regard to backward illiterate peoples in America, Africa, and Asia. The interview protocols are globally interchangeable, moreover, the answers of the pre-formal adults resemble those children worldwide give (Tulviste, 1979: 73-80; Cole, Scribner, 1974; Scribner, 1984; Oesterdiekhoff, 2009a: 73-82). "So it seems correct to state that there may be no theoretic syllogistic reasoning in the cultures that are strictly traditional." (Tulviste, 1979: 77)

When the so-called primitives do not even master tasks of sub-stage A, then they will surely fail referring to the more difficult tasks such as the pendulum task, belonging to B. While 66 % of white boys and 44 % of white girls after six years of school attendance in Australia mastered the pendulum task, not one person among a sample of 1.500 people from Papua New Guinea solved this task. Only a small percentage of university students from Papua New Guinea and Black Africa were successful in this task (Kelly, 1977: 183).

Thirty years ago, Barbara Freitag (Freitag, 1983: 354) found that 50 % of illiterate teens aged 16, living in Favelas in Sao Paulo, stayed at the border preoperational & concrete-operational stage, 41,6 % were within the concrete stage, and 8,4 % were at the border concrete- & formal-operational

stage. 59 % of the adolescents in Sao Paulo mastered the first steps of formal thinking after 8 years of school attendance (see also Fernandez, 2001). Peluffo (1967) showed 45 years ago that only 25 % of rural adolescents and 20 % of illiterate adult rural residents in Sardinia attained the first steps of formal thinking, against 55 % of youth stemming from a more middle class background.

80 years of cross-cultural Piagetian research has accumulated fully corresponding results from different milieus, classes, and ethnicities around the globe. These results follow certain predictable patterns. Only populations of modern, industrial societies complete the concrete operations and develop at least sub-stage A of formal operations. Populations of developing countries are falling behind largely due to bad school curricula (only 59 % of Paulistas with 8 years of school attendance were at the formal level) or due to illiteracy (91,6 % of illiterate Paulistas were below the formal level). This result does not only concern Black people in Africa or Papua New Guinea, people even with European origins in South America, illiterate Asians and Arabians, but also Europeans living in non-modern social structures. When only 20 % of illiterate Sardinian adults reach the formal level, 45 years ago, then we can better understand, why illiterate Europeans not only in Southern Europe but everywhere in Europe, one 100 years ago, reached IQ scores of 50 or 60. Strictly pre-modern populations are always staying on pre-formal stages, whether they have European, Asian, African, or American origins. There are tribes and huge percentages of populations staying predominantly on the preoperational stage, other tribes and peoples may stay more on the concrete level. According, for example, to the surveys mentioned of Luria and Kelly, there is no formal operational thinking among strictly traditional people as the Kashgar in 1932 or the Papuans in 1977. Sao Paulo in 1980 or Sardinia in 1967, however, are very different social settings, partially modern and educated. Therefore, 10 or 20 % even of the illiterates master the first steps of formal operations. These findings suggest that the stages of operations have originated during the history of humankind and are not universal and biologically given as language or the preoperational stage do. Especially the stage of formal operations is a specific phenomenon bound to modern, educated populations only. Thus, the present modernization of the world is carried and accompanied by the continuous rise of formal operations around the globe. The cognitive maturation of mankind unfolds unequally but steadily.

This result concerns all domains of reality and fields of experience regarding all logical, physical, social, and moral phenomena. It is not restricted to specific areas but encompasses all parts of thinking and cognition. This implies that pre-modern humans experience themselves, other persons, society, and physical world in a way different from modern humans. The tests applied reveal that pre-modern populations around the world largely answer the same way to questions about logic, physics, social world, and morality as children on preoperational or concrete operational stages do. More than 1.000 empirical test results carried out in the five continents evidence that the reasoning of pre-modern populations stays on pre-formal stages with regard to all topics (Dasen, Berry, 1974; Dasen, 1977; Poortinga, 1977; Eckensberger, 1979; Werner, 1979; Schöfthaler, Goldschmidt, 1984; Mogdil, Mogdil, 1976; Hallpike, 1979, Hallpike, 2004; Oesterdiekhoff, 1997–2012). Thus, Jean Piaget was right to launch comparisons with primitive peoples or antiquity when describing the logical, social, physical, and moral cognitions of children, in most or all of his books.

The ethnologist Christopher Hallpike (1979) was the first to deliver a groundbreaking and overall interpretation of the empirical surveys of PCCP, nearly 50 years after its beginning. Beforehand psychologists only applied the tests and collected the data without considerations of implications and consequences worth to be mentioned. They usually were unable to interpret the data and unable to understand their relevance. Hallpike showed especially with regard to logic and physics that humans of primitive societies think in a way that completely corresponds to the facts developmental psychology has collected with regard to children up to their tenth year of life. He worked out that ethnology and ethnography highly should depend on developmental psychology as an indispensable theoretical basis in future. To my opinion, Hallpike was the first scholar in the history of sciences who brought along a theoretical breakthrough with reference to ethnological theory since the days of Lucien Lévy-Bruhl, who wrote his outstanding books between 1910 and 1940.

In 1987, I finished a voluminous study that gives an overview on the data about logical, physical, social, and moral issues, PCCP had collected from its beginning (Oesterdiekhoff, 2009a). Thus, the overview covers the whole development of cognition, psyche, and personality, not only certain domains. I took data from bands of gatherers and hunters, tribal societies, and current

developmental regions, always encompassing the four fields mentioned. Additionally, I applied these data to those from the historical disciplines, which have dealt with Western antiquity, ancient India and China. Against this background, I was the first to develop a theory, basing on PCCP, encompassing all types of societies and all cognitive issues and topics as well. Thus, I could conclude that really all pre-modern societies stay on pre-formal cognitive stages.

In the meantime, I have written ten books and numerous articles on this subject. I showed that only the pre-formal structures explain the pre-modern structures of law, manners, morals, magic, religion, philosophy, sciences, and worldview. Conversely, I worked out that the historical rise of anthropological stages or formal operations accounts for the rise of sciences, the age of enlightenment, the humanitarian revolution, emergence of democracy and industrial revolution, developments, which all took place or started in the Western world during the 18th century. The rise of formal operations caused the liquidation of superstitions such as belief in magic and witchcraft, ghosts and ordeals, and originated the disenchantment of the world, the rise of agnosticism and atheism. We cannot understand the emergence of the modern, industrial society (initially the rise of the Western world) without this evolution of cognitive structures. Rise of sciences, age of enlightenment, and humanitarian revolution are largely cognitive developments. Emergence of democracy and industrialism entails both institutional and cognitive transformations. Therefore, the conclusion is undeniable that the rise of anthropological summit or the cognitive maturation is the hand, whereas the five evolutions mentioned are only the five fingers of this hand (Oesterdiekhoff, 2006b, Oesterdiekhoff, 2006d; Oesterdiekhoff, 2007a; Oesterdiekhoff, 2008a; Oesterdiekhoff, 2010; Oesterdiekhoff, 2012a; Oesterdiekhoff, 2012b; Oesterdiekhoff, 2011a: 192-205).

Thus, PCCP delivers the basis to reconstruct humanities and social sciences as well; it leads to a new theory of social change and social evolution basing on a new historical anthropology. My structural-genetic theory programme has done meanwhile a good deal of the work, which consists of the combination of PCCP and humanities. But before I present some main findings regarding this issue, I want to draw some conclusions referring to the tests mentioned in order to answer the questions put in the preceding chapters.

Causes of rising intelligence and emerging operations

Already the first Piagetian test researchers, as the IQ testers too, identified environmental factors such as maternal care, nutrition, physical requirements, and education as the decisive factors affecting cognitive growth (Vernon, 1969: 66; Vernon, 218f, 232; Biesheuvel, 1974: 223; Greenfield, 1998: 90, 137; Dasen, 1974b; Werner, 1979; Neisser, 1998a; Flynn, 2007, Flynn, 1998: 44). The indulgent and passive patterns of pre-modern mothers can influence intellectual growth negatively as especially Staewen (1991) worked out very convincingly, but also Adjei (1977), Crijns (1966), and Parin (1978). But among all factors examined so far it is quite clear that the quality and quantity of schooling are the strongest factors for the rising IQ scores and operations, too. Illiteracy or bad curricula are common in pre-modern societies. Compulsory school attendance and the spread of secondary schools and universities have been part of the modernization process wherever it has taken place. Compulsory school systems were usual in Europe more or less not before 1900, in Southern and Eastern Europe still later. The share of high school graduates amounted to 6 % of their age group in the USA in 1900, 55 % in 1950, and 75 % in 1962 (Herrnstein, Murray 1994: 144).

Illiterate children in Black Africa lose 5 points per year in comparison to schooled children (Vernon, 1969: 77). “It is virtually axiomatic that formal education has a marked effect on test performance in the African context. Strong positive relationships between test performance and the amount of schooling have been found in nearly every African study, regardless of whether it was conducted within the strictly psychometric or the more experimental cognitive research paradigms.” (Kendall et al., 1988: 306)

According to Barber (Barber, 2005: 274), length of school attendance explains two-thirds of the IQ gains. This seems to be a realistic estimation or computation. However, all features of modern society, from more intelligent parents over school and media to occupational conditions, have influenced the growth of operations and intelligence. Conversely, whenever these conditions are missing, human brain and psyche remain on more childlike anthropological stages, pre-operational or concrete operational stages, and have lower IQ scores.

As modern neurology emphasizes (Singer, 2002), the development of the human brain in ontogenesis highly depends on environmental influences. Whenever highly demanding

requirements do not influence brain and psyche, especially in early ontogenesis, and do not follow stepwise according to an appropriate and fostering curriculum, the development of brain and psyche is hindered or blockaded. We cannot understand the divergent developmental courses of modern and pre-modern man without the theory of the "developmental window", without a theory, which combines neurology, developmental psychology, and socialisation techniques (Oesterdiekhoff 2012 a, b). It is the exposure of human being to all influences of modern culture, from his birth and first years on, which boosts his anthropological summit. Whenever these external conditions have a traditional or archaic character, humans have no chance to attain higher scores, stages, or summits (Hallpike, 1979; Staewen, 1991; Oesterdiekhoff, 2009a: 63-111).

Was pre-modern man a child?

Children, exposed to intelligence tests appropriate for adults only, attain lower scores than adults. Four-years-old children reach scores of more or less 20, eight-years-old children scores of 50, thirteen-years-old teenagers 70, and eighteen-years-old persons finally 100, the mean values of the (adult) people they belong to (Vernon, 1969: 19). With growing age children are better on these tests made for adults. Thus, intelligence is a phenomenon that grows continuously during childhood and adolescence. This implies that children are actually less intelligent than adults. Intelligence does not exist as a fully developed capacity at birth but is a developing phenomenon. When brain, psyche, and personality reach their peak after two decades then also intelligence attains its summit. This fundamental fact alone verifies my thesis that intelligence is a part of the entire development of psyche and personality and can be isolated only due to methodological reasons. Additionally, this fact evidences that intelligence research should be a part of developmental psychology.

Humans with lower than average test scores are behind the normal paths of intellectual development. It has been common practice in psychometric research to estimate the "mental age" or the "developmental age" of a person against these comparisons with children´s performance since the days of Alfred Binet or even before. A mildly retarded person with scores of 70 is said to be a person that has a developmental age of a thirteen-years-old teenager (Vernon, 1969: 19; Inhelder, 1944).

Porteus (1937) estimated the IQ of adult Kalahari-Khoisan upon a developmental age of 7,5 years. Illiterate Brazilians were said not to develop above a mental level of seven years of age, a typical and regular final stage of illiterate, pre-modern human beings. Peoples who do not master tests at all and do not even understand the procedures of, for example, Raven´s Matrices, peoples that therefore do not attain even values of 50, stay then on still lower levels. European children understand the procedure with Raven´s Matrices when they are seven years old; many primitive tribes do not reach that level and are therefore not testable (Vernon, 1969: 77, Vernon, 142; Freitag, 1983; Crijns, 1966; Maistriaux, 1955: 415; Rindermann, 2008a). Against the background of psychometric intelligence research we have to conclude that illiterate, pre-modern humans usually distribute between a developmental age of five and thirteen years of age, more often between five and ten. Intelligence testers, however, do not measure the anthropological level of personality, but only the level of intelligence respectively the level of reasoning capabilities. Thus, they could maintain that pre-modern man yet has the intelligence of a child, but not a childlike personality. They could restrict the identity of pre-modern man and child solely to the phenomenon of intelligence.

To deepen the analysis and to solve this problem, it is therefore useful to compare them with the PCCP data. First of all, there are clear correspondences between the two groups of data with reference both to pre-modern and modern populations. "Children in non-industrial societies have been found to score at the lower levels of Piagetian operativity as well as on traditional Western intelligence tests." (Mogdil, Mogdil, 1976, vol. VIII: 70) Reversely, when Asians are better than Whites in IQ tests, then in Piaget tests, too (Mogdil, Mogdil, 1976, vol. VIII: 60). Formal operations imply the use of deductive and abstract forms of thinking; psychometric research understands with high intelligence exactly these forms of abstract thinking. Thus, pre-formal reasoning implies a bad use of abstractions and deductions, that is, a low form of intelligence. Therefore, higher IQ scores correspond to formal operations and lower scores to pre-formal stages. Scores up to 50 match more or less to preoperational thinking, scores between 50 and 70 to concrete-operational thinking, scores between 70 and 105 sub-stage A, and scores above 105 sub-stage B (Inhelder, 1944;

Anthony, 1965). Therefore, intelligence research supports the facts of PCCP that many populations have stayed on the preoperational level and many others, for example West Europeans and North Americans one 100 years ago, more on a concrete-operational level (Flynn, 2007; Oesterdiekhoff, 2009a; Oesterdiekhoff, 2012a; Oesterdiekhoff, 2012b).

Though, the contribution that PCCP respectively structural-genetic theory programme can offer to the psychometric tradition is quite bigger. When Porteus, Vernon, and others compute the developmental age of pre-modern or ancient man with seven years, then this result matches to estimations, which result from PCCP. A person on a completely preoperational level would have a developmental age of under seven, may be of five or six years. A person on a partial pre-operational and partial concrete level would have a developmental age of about eight years. A person, on a completely transformed concrete level, but who did not develop the formal level, would have an anthropological level of a child of ten years of age approximately. I remind the above-mentioned surveys: most of them found an asymptotic and partial development of concrete operations in adult humans living in contemporary or recent developmental regions. This implies, that against the background of PCCP the computations of psychometric researchers regarding the developmental age of illiterate adults of traditional milieus are in the right. I remember the cited statement of Patricia Greenfield, who contended that the illiterate adult Wolof has a developmental age of nine.

When 30 or 50 % of modern humans may stay on sub-stage B, then they have more or less a developmental age between 15 and 20. When 50 or 70 % of modern humans attain only sub-stage A, then their developmental age distributes between 10 and 15. When current pre-modern populations are characterized by half-developed concrete operations, what is the usual case, then they reach anthropological summits of about eight-years-old children. There are a lot of tribal societies with still lower summits, as I will describe below more exactly. Thus, we can conclude that the anthropological summit of modern man has an adolescent or teenager character, whereas the anthropological summit of pre-modern man has more a childlike character.

Additionally, the data of PCCP encompass greater parts of personality and psyche, all logical, physical, social, and moral dimensions of world understanding. As PCCP covers the overall development of psyche and cognition, the determination of a person as standing on a preoperational or concrete operational level really implies that he or she has an anthropological summit of a child of six or ten years. Against the fact that the developmental approach also covers the realities the psychometric approach describes, as evidenced, it is quite clear that the determination of Porteus or Vernon concerning the developmental age of pre-modern humans is by no means restricted to reasoning abilities, but encompasses the complete psyche and personality.

Everything what developmental psychologists found out as characteristics of children aged 4-12 corresponds to the peculiarities ethnographers identified among the primitives. Jean Piaget himself always hinted to these parallels with regard to all the phenomena he described and discovered among children of this age. However, there must be differences between the so-called primitives and children. Children usually do not build churches and cities, windmills and canons, do not breed cattle, and do not manufacture equipment, clothes, and furniture. Therefore, Christopher Hallpike (1979) differentiated between quantitative and qualitative aspects of development. Qualitative development means stage development; quantitative development refers to the accumulation of knowledge and life experience. An adult primitive man has much more life experience and knowledge in comparison to a child although they may have the same anthropological summit or developmental age. A modern child is only one year long eight years old; a primitive man may have this developmental age 50 years. Against this background both the common things and differences between children and primitives are understandable. Thus, primitives and children share the qualitative development but not the quantitative development. However, the qualitative development respectively the common anthropological summit has an overwhelming influence on shaping thinking, worldview, and behavior of the primitives, and therefore on the development of culture and history of mankind.

The notion about the “parallels” between children and primitives is the most astonishing and fascinating phenomenon in all humanities and social sciences. The parallels are more or less identities, which result from the fact that the primitives are staying on anthropological stages of children and are characterized by the same cognitive structures. Thus, the common structures are not only homologies as Jürgen Habermas (1976) stipulated but structural identities. Moreover,

there are no real parallel developments but there is only one development: Pre-modern people are humans whose development stops somewhat earlier as common among modern people. When their development stops earlier then they remain bound to children´s structures. The structures are identical and not only "parallel" or "homolog".

All humanities and social sciences especially up to 1970 taught about the similarities between primitive and modern humans. Most scholars did not know that the nature of primitiveness is to disclose only against the background of the notion about the childlike nature of primitive man. Thus, they did not know about the true roots of primitiveness. Even if scholars paralleled children and primitives they usually did not know about the structural identity of primitive man and child, so for example Wilhelm Wundt, James Frazer, Lew Wygotski or Alexandr Luria. However, numerous scholars between 1800 and 1970 understood this structural identity at least partially (Werner, 1948; Stern, 1924; Tylor, 1871; Zeininger, 1929).

Besides, also some scholars of PCCP and intelligence research hint to the childlike nature of primitive man. These scholars understood more or less that the central interpretation of the test results has to hint to the childlike nature of primitive man. "Moreover more backward groups typically fail to progress as far as others along this scale, and though they may develop lower-order skills which are highly effective for survival, their reasoning capacities remain similar in many ways to those of younger children, or even regress through lack of appropriate stimulation." (Vernon, 1969: 215) Robert Maistriaux, exposing Arabian and Black African people to tests such as Raven´s Matrices or Piaget tests, writes in his excellent study: "En tout cas, le comportement des primitives semble en tous points semblable à celui des enfants." (Maistriaux, 1955: 416).

Among the scholars, who understood the childlike nature of primitive man more or less, were the founder of sociology, Auguste Comte, and Norbert Elias, held to be the last representative of classical sociology. Moreover, this notion belonged to the centre of their theories. The most prominent British sociologists one 100 years ago, Herbert Spencer and Leonard Hobhouse, had some hunch of this phenomenon. Most of the founders of developmental psychology such as Stanley Hall, James Mark Baldwin, William Stern, Heinz Werner, Jean Piaget, and Karl Zeininger knew about this fact. Authors such as Hermann Schneider, Karl Lamprecht, Emma Brunner-Traut, Charles Radding, Felix Krüger, Friedhart Klix, Donald Le Pan, Jürgen Habermas, and Suzi Gablik understood these facts at least partially. Moreover, the contention, primitive man may have a childlike nature, is to find among uncountable historians, ethnologists, missionaries, voyagers, and practitioners working in developmental regions for generations. Albert Schweitzer is one of these thousands experts (Oesterdiekhoff, 1997; Oesterdiekhoff, 2000; Oesterdiekhoff, 2009a; Oesterdiekhoff, 2011a; Oesterdiekhoff, 2011b; Oesterdiekhoff, 2012a; Oesterdiekhoff, 2012b).

Heinz Werner (1948) wrote in 1926 a book that was fully dedicated to the comparison between children and primitives. This book was a breakthrough with regard to the evidence of the childlike nature of primitive man because he described the "parallel" developments referring to all dimensions of personality, not only to cognitive dimensions. He wrote the comprehensive book about this topic that Piaget should have envisaged but never started to write all his lifetime. Alexandr Luria (1982) brought along nolens volens the most concise and pregnant evidence to the fact, also he himself did not understood these implications fully. The next two steps have been especially the mentioned books of Hallpike and Oesterdiekhoff. Especially Hallpike and Oesterdiekhoff worked out the consequences regarding theory building in humanities and social sciences.

Cognition and culture of pre-modern societies

I want to show in the chapters 8 and 9 very shortly but concisely that it is impossible to understand pre-modern and modern humans, moreover, pre-modern and modern societies, without these notions PCCP and structural-genetic theory programme brought along. Pre-modern societies are made by humans on lower stages, whereas modern societies directly result from capabilities humans on higher stages have available. The huge differences between pre-modern and modern societies largely have to be referred to the anthropological differences mentioned. A full theory of social change, culture, and history needs to refer to these notions outlined in the previous chapters. Besides, the following descriptions support and illuminate the theory of the childlike psyche of pre-modern man. I can present here only very shortly some examples; I recommend reading my books in order to deepen these insights. I am going to describe the phenomenon of metamorphosis, animism, trials against animals, magic, ordeals, and religion.

Karl von den Steinen (1894) reports about Indians of Brazilian rain forest, who persecuted an escaping slave. As they did not find him they maintained a turtle they found on the way was the slave, who turned to this animal. Many ethnographers, among them Lucien Lévy-Bruhl (1923, 1971, 1931, 1938, 1983) documented that this belief in metamorphosis belongs to the everyday beliefs to find in really every primitive society. This standard belief is to find in the everyday understandings of reality and in religion and magic as well. "Humans of all pre-modern cultures believe humans, animals, plants, stones, and stars could completely transform their shape, figure, constitution, and the kind to which they want to belong. A stone can transform to a human or a ghost, a beast can turn to a star and a human, and a god is able to become a tree or a rock. Every soul has the power to take another material cloth and can chose among all hulls possible. Every soul can belong to different kinds, dead matter, plants, animals, humans, stars, and gods, either by own will or by the magic of other powers." (Oesterdiekhoff, 2011a: 110) This belief in metamorphosis is the fundament on which both the myths of creation and the corresponding annual ceremonies of totemism, vegetation, and creation stand. The ancestors created the world by their transformation to all objects and beings the cosmos consists of. And the descendants in their religious rites reproduce this creation of the world annually by their alleged metamorphosis to all phenomena of the world during their rites (Spencer, Gillen, 1899).

"The fact is, nobody doubts that such things can happen. This kind of belief is very widespread. Among the Bantu it is quite commonly believed that if a lion or a leopard attacks a man, it is not an actual lion but really a sorcerer who has transformed himself in order to gain his end." (Lévy-Bruhl, 1983: 225) "... when a wolf takes off its skin and reveals himself to be a human being, any Eskimo will be familiar with that particular transformation: he has met with it time and again. So such a trifle will not hold him back for a moment. The question will not even arrive in his mind, because in his repertoire of possibilities this is something too ordinary to hold a challenge. If we raise the point with him, and supposing he understands what we are questioning, he will be as much surprised by our doubt as we are by his belief." (Lévy-Bruhl, 1983: 240)

It would be impossible to convince a person living in a modern culture of the possibilities of these kinds of transformations, no matter which sorts of brain washing or techniques being used. However, children by the age of six believe in metamorphosis, too. R. De Vries (1969), for example, put a dog mask upon a cat´s head and asked children about the identity of the animal. The children aged four, five or six years believed that the cat turned to a dog. Although they had played with the cat beforehand, they now feared the "dog", expected his biting and barking, and surmised the "dog" would have now skeleton and organs dogs have. Children aged seven and older denied the possibility of metamorphosis, saying there is a cat outfit by a dog mask only. Other test procedures found out the same phenomenon. Many child psychologists described the related children´s beliefs encompassingly. De Vries (1969) and Flavell (1977) regarded the understanding of the invariance of the species, as the invariance of volume, mass, number, etc., as a part of the establishment of the concrete operations. Thus, the belief in metamorphosis is a manifestation and dimension of the preoperational stage. The full belief in metamorphosis is a clear indicator that such a population stays largely on the preoperational level. If we only knew from the primitives their belief in metamorphosis, this would be enough to evidence their childlike anthropological nature.

The tendency to animism, anthropomorphism, and personification as a main feature of children and primitives as well has been in the focus both of ethnology and child psychology since their beginnings. Although nearly every early child psychologist described children´s animism, Jean Piaget (1959, 1969) delivered probably the most impressive contribution to the phenomenon. He evidenced that animistic thinking is the stronger the younger children are. The tendency to attribute "life" and "consciousness" to dead matter weakens especially after the sixth year of age and is vanished with ten years among children of industrial societies. Adolescents on the formal-operational level replace animistic explanations by empirical-causal explanations and develop the understanding of the cosmos as a mechanical order, ruled by physical regularities. Uncountable ethnographers and historians have described that primitives regard stones, man-made objects, mountains, rocks, rivers, clouds, stars, sun, moon, winds, storms, etc. as living beings, even equipped with some forms of understanding and reasoning, will and personality. They understand the whole cosmos not as a mechanical order but as a society of persons. The regularity of phenomena does not result from physical regularities but from the free will of persons, who obey divine commands. They understand this way the stellar movements, the change of the seasons, the

"behavior" of rivers and mountains, and incidents such as earthquakes, storms, or floods. "At Kiwai island the Papuans carry offerings to the harpoon which has killed a dugong for them, in order to show their gratitude, and also with hope of persuading it to be helpful to them again at some time in the future. In other places various kinds of requests are directed to tools and implements, weapons or canoes." (Lévy-Bruhl, 1983: 111) Thus, the primitives around the world pray and bring sacrifices to mountains, rivers, rocks, forests, stars, sun, moon, even to the four seasons and to surprising incidents. They do not only see the things and occurrences as persons, but also often as gods, who need therefore regular adoration and food.

The animistic worldview dominates the whole pre-modern world around the globe by the 17th century, when the mechanical philosophy in Europe came into being. Mechanical philosophy and physical sciences started by the removal of the magical-animistic worldview. The evolution of formal operations accounts for this elimination of animism and for the rise of mechanical worldview as well, both in the evolution of sciences 300 years ago and in the psyche of adolescents, living in modern societies. When we only knew from the primitives the phenomenon of animism this would be enough to evidence their pre-formal and childlike anthropological level. Only adolescents of modern societies surmount animism, pre-modern adults and pre-modern philosophies and religions never. (Oesterdiekhoff, 2009a: 211-223; Oesterdiekhoff, 2011a: 96-101; Oesterdiekhoff, 2012a; Oesterdiekhoff, 2012b; Piaget, Inhelder, 1958; Piaget, 1975: vol. 8-10; Piaget, Garcia, 1989; Lévy-Bruhl, 1971).

The tendency to attribute humanlike will, personality, and reason to objects and dead matter, plants and animals, the tendency to anthropomorphism and personification are parts of animistic thinking. Primitive peoples around the world tend to attribute reasoning and will to plants (Lévy-Bruhl, 1971; Lévy-Bruhl, 1938; Lévy-Bruhl, 1931: 43-109). R. Fortune described the deep conviction of Melanesians regarding willpower and understanding of plants. The Dobu islanders speak to the yams in order to secure their growing; they regard them as transformed humans, outfit by all cognitive capacities. "´But´, I said, ´how is it yams are persons? Do persons stay still always?´ Alo had his counterstatement. ´At night they come forth from the earth and roam about. For this reason, if we approach a garden at night we tread very quietly... We do not dig the harvest when the sun is low in the morning. We wait till the sun has mounted. Then we know they are back. If we dig in the early morning, how should we find yams? Nothing would be there.´ This statement proved to be no spontaneous argument, but a direct statement of traditional belief." (Fortune, 1963: 107f)

When primitives tend to regard even plants as understanding persons, it is quite clear that they have enormous difficulties to consider the differences between the cognitive capacities of humans and animals. Thus, they attribute humanlike willpower, reasoning abilities, language understanding, and moral responsibility to animals. Edward Evans-Pritchard (1976) showed that the Azande, a people from Sudan, believe that the termites know everything what happens in the villages and are therefore able to decide what the humans have done in the past and what they should do in future. The Azande use to ask the termites, in form of an oracle, about past, present, and future activities. The termites are partially the masters and judges of the Azande.

Hunters around the world have behaved in a way that is only explainable against the fact that they really believed the animals would observe their activities, equipped with full human mental capacities. Before the chase starts magicians ask the animals to come. They promise them a good future when they agree to arrive to places where they are caught and killed. It is strongly believed around the world that without magical incantations the animals cannot be caught. Conversely, very often the hunters try to avoid that the animals experience their intentions. The hunters do not speak in their settlement where and whom they want to chase. They are afraid the birds could listen to the talks at the fire or during the walks and could warn the fish in the rivers or the deer in the forest. Therefore, the hunters talk silently or not at all and take many precautions to lead astray the observing and surrounding world of animals (Lévy-Bruhl, 1985).

Correspondingly, the attacks of predators are seen as malevolent actions of murderers. Primitives tend to regard attacks of beasts as criminal actions. Thus, if a person is killed by an animal the tribesmen tend to avenge the dead by prosecuting either the animal or even his clan or species. Black Africans crucified killing lions or Native Americans tortured horses of hostile tribes over hours or days as if they were malevolent and devoted members of them. Primitives tend to blood revenge both against animals and humans (Lévy-Bruhl, 1971).

If they have judicial institutions, they bring the animals to courtyard. Animals having committed a crime such as assassination, theft, destruction of property or kidnapping, are accused the same way as humans. Animals as accused beings in front of judges, jury, lawyers, and witnesses – this phenomenon was usual in China, India, Europe, and Africa. This phenomenon was common in Europe by the age of enlightenment. Mice or rats, which devastated a harvest, were summoned in the field to appear in courtyard. Pregnant or sick animals received more time to travel to the courtroom. The judge took the grasshopper, mouse, fly, snake, or whatever in his hand and announced his judgment. The advocate defended the animal against the accusations. Convicted animals usually received the same punishments as humans. They were beaten or killed by torture, decapitation, fire or hanging in front of a great audience. Sometimes the church excommunicated them as if they had been members of the church without christening beforehand (Oesterdiekhoff, 2009c; Oesterdiekhoff, 2012b, Oesterdiekhoff, 2011a: 102-109; Fischer, 2005; Evans, 1906).

There is no doubt that ancient man really believed that animals had a free will to decide, could reason as humans do, could understand human language, had to obey human laws and moral codes, and could overtake moral responsibility. “The people recognize animals as moral persons, with a free will, free to decide whether they want to act this or another way, able to decide whether to leave fields or not, able to sign and to keep contracts with humans, and apt to carry responsibility for social institutions and moral values.” (Fischer, 2005: 90, transl. by G.O.) “The capital punishment of a dumb animal for its crimes seems to us so irrational and absurd that we can hardly believe that sane and sober men were ever guilty of such folly.” (Evans, 1906: 157).

The misinterpretation of psyche and capacities of animals results from animism and pre-formal reasoning abilities. Pre-formal reasoning is so weak that it cannot distinguish between the abilities of humans and animals. Child psychology from its early beginnings showed that children attribute language, reason, and morals to animals. Humans only on the formal-operational level, as Piaget (1959) already found out, understand that psyche is restricted only to animals and humans but not to dead matter and plants, and that reason is an ability liable only to humans. I remind the difficulties intelligence research has upon interpreting low scores of pre-modern people and the Flynn effect. It is clear that peoples must have scores of below 70 in order to be capable to prosecute animals. This phenomenon is a better indicator of low intelligence scores and a childlike psyche than anything else. The prosecution of animals evidences not only weak forms of intelligence but the prevalence of a childlike psyche and personality to every respect and to its deepest sense possible.

It is impossible to study the culture of pre-modern societies without facing the huge importance of magic in their everyday life and religious rites. All pre-modern cultures assume that gods, ghosts, humans, animals, and objects steer by magical influences all occurrences and regularities happening in the world. The order of the world and the occurrences do not result from empirical-causal factors, from natural and physical factors, but from mystical factors, which originate from divinities and magicians using magic. Gods, ancestors, sorcerers, witches, and other supernatural beings make the daily course of stars, oceans, seasons, rains, storms, epidemics, wars, droughts, etc. They decide about every single birth and death, every single sickness and recovery, every single incident and phenomenon, every single luck and mishap, wherever it may happen in the world. The primitives always hint to god, ghosts, or magicians when a person fails or succeeds, the sun is too hot or too weak, the cows are sick or fat, or a war brings victory or defeat (Evans-Pritchard, 1976; Lévy-Bruhl, 1923; Lévy-Bruhl, 1931; Lévy-Bruhl, 1938; Fortune, 1963; Mair, 1969; Oesterdiekhoff, 2009a: 203-210, Oesterdiekhoff, 2011a: 112-117).

Among hundreds of observable consequences magical beliefs bring along to the everyday life of primitives, I demonstrate this remarkable influence only upon two examples. Especially in Black Australia and Papua New Guinea, in Indian America and Black Africa, but also in pre-modern Europe, China, and India, every death was seen as a murder. The peoples understood every birth and death as mystical phenomena: Gods or magicians give every birth and take every life. To take a person´s life means to kill him, either to bring him to hell or to heaven, either to eat him or to transform him to another species or place. The primitives discuss whether it was god or a human being who killed the person, who just deceased. In medieval Europe god is mostly the killer, when a person dies; in Black Africa gods and humans assassinate half of the population each approximately (Mair, 1969), and in Black Australia or Papua New Guinea humans are said to kill much more persons than the gods (Lévy-Bruhl, 1931: 165-226; Lévy-Bruhl, 1938; Lévy-Bruhl, 1923;

Evans-Pritchard, 1976; Fortune, 1963; Oesterdiekhoff, 2012b, Oesterdiekhoff, 2011a: 127-132).

When a person dies from old age, heart attack, infection, or accident people ask immediately who might have been the killer responsible. If they do not know this at once they ask some ordeal. The ordeal of poison, fire, termites, or whatever announces the murderer. Often the ordeal blames a close relative, but also neighbours, strangers, or enemies. Sometimes it is enough to punish the ascertained and guilty person without capital punishment, but very often the person is killed. Sometimes dozens or hundreds of persons have to take the poison ordeal to evidence their innocence. Then many persons die due to the poison, as consequence of the death of an old man who passed away from cancer, heart attack, or whatever. It may happen that the relatives, the clan, or the tribe of a charged person defends him against the revenging group. Then the death of a person, who died from an accident, can arouse a war with many casualties. This implies that the understanding of the death as a mystical phenomenon, of the death as an assassination, leads to dramatic and fatal consequences. The natural death is understood as assassination. Therefore any innocent person has to die because he is regarded to be the murderer. Thus, a natural death leads to an irrational assassination of an actually innocent person. This praxis has largely influenced the low level of population growth of humankind during most parts of history (Oesterdiekhoff, 2012b; Oesterdiekhoff, 2011a: 127-132; Lévy-Bruhl, 1923; Lévy-Bruhl, 1931: 165-226).

Developmental psychology from its very beginning described magic as a part of children´s psyche. Not only the cognitive egocentrism, the lack of categories such as causality and chance, the animism, etc., but the entire psyche and personality of the child account for the belief in magic. Developmental psychology described that the belief in magic is stronger the younger the child is. The belief in magic made by man vanishes largely with the ninth year of life among children of modern societies. Then children replace magical by empirical explanations (Piaget, 1959; Zeininger, 1929; Werner, 1948; Stern, 1924; Oesterdiekhoff, 2006c; Oesterdiekhoff, 2011a: 112-117; Oesterdiekhoff, 2009a: 203-210). Ethnography and the historical disciplines evidenced that primitives never surmount in their lifetime the belief in magic. According to Evans-Pritchard (1976), for example, there is not one individual among the Azande who doubts into existence and utility of magic. If we only knew from the ancient peoples their belief in magic and the incredible consequences of it, this would suffice to evidence their childlike anthropological nature beyond the slightest doubt.

The belief in the ordeals itself is deeply rooted in children´s psyche. The ordeal by fire, water, poison, or whatever is one of the main decision instruments in primitive societies, with regard to experience past occurrences or to plan future activities. Moreover, it has been one of the main judicial procedures in all pre-modern societies around the globe. There was no pre-modern society without ordeal practice. The inherent logic was everywhere the same. An accused person has to take poison, to hold his hands into fire or burning water, or has to face a duel. When he survived the poison probe or the duel, when he did not burn his hands, then he was cleared from the charges. Conversely, the beaten, hurt, or killed person was automatically guilty of the charges. This implies that millions of delinquents came free, whereas millions of innocent persons died, either by the ordeal itself or by capital punishment, following the failure in the procedure. The people believed that water, fire, or poison as divine powers themselves know about the truth, or that divinities influence the procedure.

Developmental psychology found the same assumptions among children largely by their tenth year of age. Jean Piaget (1932) designated the related belief of children as “immanent justice”. In his own survey of 1932 in Switzerland, he found that 86 % of the children aged six, 54 % aged nine and ten, and 34 % aged eleven or twelve surmised that a bridge would collapse, when escaping children, who had committed a theft, would cross it. Enquiries of PCCP in developmental regions evidenced the prevalence of immanent justice not only among children there but also among adults. I demonstrated that the belief in ordeals is completely rooted in immanent justice and in the psyche of children (Oesterdiekhoff, 2002a; Oesterdiekhoff, 2002b; Oesterdiekhoff, 2011a: 118-126; Oesterdiekhoff, 2009a: 344-367; Oesterdiekhoff, 1997: 93-102). If we only knew from pre-modern peoples that they use ordeals as official means of proof and conviction this would be sufficient to evidence their childlike anthropological summit.

In my book about religion I show, following the ideas of Ludwig Feuerbach, that developmental psychology can explain both religion and the rise of agnosticism and atheism. Developmental psychology does not explain some aspects and dimensions of religion but the entire

phenomenon. Religions of tribal societies and civilizations consist mainly of the following subjects: belief in divine creation of cosmos, world, and humans, belief in divine control over regularities and occurrences, belief in divine reward and punishment upon humans, belief in sanctions by worldly incidents and earthly biographies and by staying in paradise and hell after death as well, belief in a life after death by paradise, hell, metamorphosis, or reincarnation, belief in personal communication by prayers and sacrifices, and belief in ghosts, ancestor gods, high gods, and godfather. These core elements of religion are to find in all world religions and tribal religions around the world (Durkheim, 1965; Eliade, 1974; Frazer, 1994; Oesterdiekhoff forthcoming).

All these core elements of every religion are parts and dimensions of pre-formal and childlike anthropological stages. The belief ancestor gods created the cosmos by metamorphosis of their bodies into the whole cosmos or that godfather created the cosmos by charms is childlike in its deepest sense. Jean Piaget (1959) showed that all small children develop this belief autonomously and surmount it then by their ninth year of age: It is the original understanding of the human mind to believe that huge persons created the cosmos as craftsmen build a house or a city. As I already described, primitive peoples believe not only in the divine origin of the world once upon a time but also in the divine government through the times. The daily government of all incidents by god, gods, or ghosts is the daily reproduction of creation or the eternal continuation of creation. This equation of theology and physics, god and reality, implies the dominance of mystical forces upon empirical ones. However, this means the dominance of magic over reality. And as child psychology demonstrated, children by their ninth year of age have this full belief in magic. Further, the belief in divine rewards and punishments on earth and after death is topmost childlike. It stems from children´s expectations regarding their parents. Further, the belief in immortality of the soul or in another life after death results from the cognitive egocentrism of the child. It is a manifestation of a childlike wishful thinking. Last, but not least, the myths and legends are the main sources that inform about personalities and biographies of the gods. The peoples believed in their gods because they were able to create myths and to believe in their dreamy tales as well. Both characteristics correspond to childlike attitudes regarding myths. Finally, the most important gods in pre-modern societies are the ancestor gods that are the deceased parents and grandparents. Thus, the adoration of real relatives and imaginary godfather and other gods corresponds to the tendencies of small children towards their parents. Obviously, all dimensions of religion express not only childlike cognitive aspects but moreover a full childlike psyche and personality. True religion and childlike psyche are two sides of the same coin. My structural-genetic theory programme can nowadays describe exactly, what Feuerbach could only surmise without having any knowledge of developmental psychology.

Correspondingly it is evident that the disenchantment and secularisation of the world, the evolution of agnosticism and atheism, is nothing else than a manifestation of the rise of anthropological summits and formal operations. There were no atheists among peoples and intellectuals of the Middle Ages. Though, whenever people gain a developmental age beyond ten years, then they cannot avoid surmounting religious beliefs. The evolution unfolds from full religiousness over doubts and uncertainty to atheism. Today, roughly 50 % of the Europeans and 65 % of the Japanese are atheists, and 97 % of the members of the Royal Society of London. It is obvious that the religious people of today´s most advanced societies occupy intermediary cognitive levels between our ancestors and the brighter milieus of current society. They only have a rest religion, not the full, archaic, and vivid religion of the primitives, even not the fundamentalists. Thus, my structural-genetic theory programme entails a full theory of religion and atheism. It does not explain aspects of religion; it explains its nature and existence (Oesterdiekhoff, 2007c; Oesterdiekhoff, 2008b; Oesterdiekhoff, 2012a; Oesterdiekhoff, 2012b; Oesterdiekhoff, forthcoming, 2011a: 147-161; Oesterdiekhoff, 2009a: 224-250).

These examples suffice to evidence that the huge differences between pre-modern and modern humans and societies can only be decoded by developmental psychology, PCCP, and structural-genetic theory programme. The fact of the lower intelligence and pre-formal stages of pre-modern man is linked to customs, manners, ideologies, philosophies, religions, sciences, political forms, etc., widely divergent from the related phenomena in modern societies. Different stages of intelligence and anthropological summits account to different cultures, outfit by totally different atmospheres and practices. I estimate that most intelligence researchers and cognitive psychologists have no idea of the explanatory possibilities of their tools. Some of them would deny applying these tools to

domains belonging to ethnology, history, and sociology. It is necessary to combine the ethnological and religious phenomena mentioned with intelligence and cognitive research.

The rise of modern, industrial society

In Europe, in the early modern times, the second great evolution in human history took place: the emergence of modern society. This evolution mainly consists of five transformations: emergence of industrialism, the rise of sciences, the era of enlightenment, the humanitarian revolution, and the evolution of democracy. These five evolutions took place originally only in the Western World in the time after 1700, especially after 1750. A comprehensive theory of modernity has to encompass all five dimensions and not only the economical and technological aspects. Since their early history, social sciences have been discussing on the role of economic and intellectual components in causing the rise of the West. Whereas the materialistic positions emphasize the prime role of economics, institutions, and social conflicts, thus dwarfing sciences, humanism, enlightenment, and democracy to be secondary phenomena only, cognitive approaches worked out the decisive and causing role of intellectual processes, thus appreciating all five evolutions to the same rate.

I demonstrated comprehensively that the materialist positions, including Marxian theory, economic theory of investments, and property rights theory are erroneous, leading astray, and often contradictious (Pomeranz, 2000; Oesterdiekhoff, 2005; Oesterdiekhoff, 2006d; Oesterdiekhoff, 2007a; Oesterdiekhoff, 2008a; Oesterdiekhoff, 2009b; Oesterdiekhoff, 2010; Oesterdiekhoff, 2011a). To find a proper approach instead necessitates considering the five evolutions mentioned. The phenomena "sciences", "enlightenment", and "humanism" are merely intellectual phenomena, besides intellectual phenomena expressing evolutionary trends. "Industrialism" and "democracy" are a mixture of intellectual and institutional phenomena.

Jean Piaget and others worked out that the historical evolution of formal operations accounts for the rise of physical sciences in the 17th century, whereas the previous disciplines, dominated by magic, animism, and theology, had been liable to pre-formal stages (Piaget, 1975, vol. 8-10; Piaget, Garcia, 1989; Fetz, 1982; Oesterdiekhoff, 2012a; Oesterdiekhoff, 2012b;, Oesterdiekhoff, 1997). The rise of industrialism depends completely on the rise of physical sciences, as, for example, Margaret Jacob (1997) explained recently.

Additionally, developmental psychology described the transformation from authoritarian concepts to democratic thinking among children beyond ten years of age. Persons on lower stages prefer authoritarian forms of government and deny democracy and liberty rights. Jean Piaget (1932) was one of the first to describe the growth of the idea of democratic forms of legislation among children. The following developmental psychology supported this notion. I worked out that the evolution of democracy in Western society corresponds to the ontogenetic evolution. This implies that the rise of democracy is by no means a product of an accidental coincidence of circumstances, class conflicts, and institutional hazards but, as the protagonists of enlightenment themselves rightly maintained, a result of an intellectual evolution (Oesterdiekhoff, 2009a: 261-284, 336-343, Oesterdiekhoff, 2012b; Rindermann, 2008c).

Thus, the five evolutions took place during the same era after 1700. Therefore, they belong to each other and must be deeply interconnected. Their temporal coincidence cannot be a hazard. All five evolutions are therefore mainly intellectual evolutions, including "democracy" and "industrialism". Against the fact of the rise of anthropological summits for several years, the rise of formal operations and intelligence, especially in the intellectual elite during this period, it is obvious that the anthropological rise is the hand, whereas the five evolutions are only the five fingers of this hand. They are different manifestations of the historically unique anthropological evolution.

There have been some scholars who had hint already to the link between the rise of formal operations and the emergence of modern society, among them Jean Piaget himself (1975 a, vol. 10) and Jürgen Habermas (1976). However, my structural-genetic theory programme detailed this transformation and worked out a complete theory with this regard. The cognitive transformation of humankind from childhood to adulthood, initially originated in the West, is the reference point and the fundament to understand the emergence of modern society. This new theory has procured a theory of modern society that fulfils the principle of the sufficient reason (Oesterdiekhoff, 2011a: 176-205; Oesterdiekhoff, 2012a; Oesterdiekhoff, 2012b; Oesterdiekhoff, 1997: 249-277, Oesterdiekhoff, 2006d; Oesterdiekhoff, 2007a; Oesterdiekhoff, 2005; Oesterdiekhoff, 2010).

3. Conclusion

Psychometric intelligence research, PCCP, and structural-genetic theory programme, rightly embedded and commented, are coming to the same conclusions referring to the description of the historical development of human intelligence. Adults of all pre-modern societies around the globe are characterized by a lower intelligence or by pre-formal types of reasoning, while the increase of intelligence or the development of formal operations is a new phenomenon in world history, bound to the development of modern culture.

Developmental psychology, PCCP, and structural-genetic theory programme help to reveal the full meaning of the results carried out in the frame of the psychometric intelligence research. The Flynn effect is not an anomaly, as often interpreted, but matches to all data referring to the relationship of culture and cognition, intelligence research has found out so far. The test scores do not reflect narrowly limited mental techniques, but they really are a part of an entire cognitive system, indicators to a certain developmental stage of psyche and personality. Humans, stemming from different cultures, do not only differ by some scores, expressing some different levels of reasoning abilities. They differ much more from each other. My theory opens the classical intelligence research fruitful ways of application and of collaboration with ethnology, history, sociology, and other social sciences and humanities.

The cognitive-developmental approach, as developed in my structural-genetic theory programme, is useful in explaining mental core structures of humans living in pre-modern and modern societies. It delivers a promising theory about "humans", about the influence of humans, staying on different anthropological stages, on culture and history. The theory answers to questions raised in Historical Anthropology, Historical Psychology, mentality research, and micro-sociology. The new theory program is appropriate in describing basis structures of pre-modern societies such as magic, religion, superstition, law, morals, manners, and everyday conduct. The approach is applicable to the explanation of the evolution of modern industrial society and the rise of the West. It is in the heritage of the classical authors of developmental psychology, classical sociology, classical British anthropology, the ethnology of worldview of Lévy-Bruhl, and the philosophy of symbolic forms of Ernst Cassirer. To my opinion, this theory program is appropriate to base and to unify humanities and social sciences.

References

Adjei, 1977 – *Adjei, K.* (1977). Influences of specific maternal occupation and behavior on Piagetian cognitive development. In P. Dasen (Ed.), Piagetian psychology: cross-cultural contributions (pp. 227-256). New York: Gardner press.

Anthony, 1965 – *Anthony, J.* (1965). Applications de la theorie génétique de Piaget à la theorie et à la pratique psychodynamique. In Revue Suisse de psychologie, XV, Nr. 4.

Barber, 2005 – *Barber, N.* (2005). Educational and ecological correlates of IQ: A cross-national investigation. Intelligence. 33: 273-284.

Biesheuvel, 1943 – *Biesheuvel, S.* (1943). African intelligence. Johannesburg.

Biesheuvel, 1974 – *Biesheuvel, S.* (1974). The nature of intelligence: some practical implications of its measurement (pp. 221-224). In P. Dasen & J. Berry (Eds.), Culture and cognition London.

Bühler, 1930 – *Bühler, K.* (1930). Die geistige Entwicklung des Kindes. Berlin.

Case, 1999 – *Case, R.* (1999). Die geistige Entwicklung des Menschen. Heidelberg: Springer Verlag.

Case et al., 2001 – *Case, Robbie, Andreas Demetriou, Maria Platsidou, Smaragda Kazi* (2001). Integrating concepts and tests of intelligence from the differential and developmental traditions. Intelligence. 29: 307-336.

Chan, Vernon, 1988 – *Chan, J.W.C., Vernon, P.E.* (1988). Individual differences among the peoples of China (pp. 340-357). In S. H. Irvine & J. W. Berry (Eds.), Human abilities in cultural context. Cambridge, England.

Chapman, 1988 – *Chapman, M.* (1988). Constructive evolution: origins and development of Piaget´s thought. Cambridge, Mass.: University press.

Crijns, 1966 – *Crijns, A.G.J.* (1966). African basis personality structure. In Gawain, 14, 239-248.

Dasen, 1974a – *Dasen, P.* (1974). Cross-cultural Piagetian research (pp. 409-424). Dasen, P. & J. Berry (Eds.), Culture and cognition. Readings in cross-cultural psychology. London.

Dasen, 1974b – *Dasen, P.* (1974). The influence of ecology, culture, and European contact on cognitive development in Australian aborigines (pp. 381-408). In Dasen, Pierre & John W. Berry (Eds.), Culture and cognition. Readings in cross-cultural psychology. London.

Dasen, 1977 – *Dasen, P.* (1977). Piagetian cross-cultural psychology. New York: Gardner Press.

Dasen, 1984 – *Dasen, P.* (1984). The cross-cultural study of intelligence: Piaget and the Baoulé. *International journal of psychology*. 49.

Dasen, John, 1974 – *Dasen, P., John, W. (*Eds.) (1974). Culture and cognition. Readings in cross-cultural psychology. London.

Demetriou, Efklides, 1987 – *Demetriou, A., Efklides, A.* (1987). Towards a determination of the dimensions and domains of individual differences in cognitive development (pp. 41-52). E. De Corte, H. Lodewijks, R. Parmentier, & P. Span (Eds.), Learning and instruction: European research in an international context. Leuven & Oxford: Leuven university press & Pergamon press.

De Vries, 1969 – *De Vries, R.* (1969). Constancy of generic identity in the years three to six. Society for research in child development monographs, 34, 4, serial no. 127.

Durkheim, 1965 – *Durkheim, É.* (1965). The elementary forms of religious life. New York: The free press.

Eckensberger, 1979 – *Eckensberger, L. et al.* (Eds.) (1979). Cross-cultural contributions to psychology. Amsterdam.

Eliade, 1974 – *Eliade, M.* (1974). Death, afterlife, and eschatology. New York: Harper & Row.

Evans, 1906 – *Evans, E.P.* (1906). The criminal prosecution and capital punishment of the animals. London & Boston.

Evans-Pritchard, 1976 – *Evans-Pritchard, E.E.* (1976). Witchcraft, oracles, and magic among the Azande. Oxford: university Press.

Eysenck, 1971 – *Eysenck, H.-J.* (1971). The IQ argument. New York: The library press.

Fernandez, 2001 – *Fernandez, M.* (2001). A study of the intelligence of children in Brazil. *The mankind quarterly*. Vol. XLII, 1: 17-20.

Fetz, 1982 – *Fetz, R.L.* (1982). Naturdenken beim Kind und bei Aristoteles. Grundfragen einer genetischen Ontologie. *Tijdschrift voor Filosofie*. 44: 473-512.

Fischer, 2005 – *Fischer, M.* (2005). Tierstrafen und Tierprozesse. Münster & Hamburg: Lit-Verlag.

Flavell, 1977 – *Flavell, J.* (1977). Cognitive development. New Jersey: Prentice Hall.

Flavell, 1987 – *Flynn, J.R.* (1987). Massive IQ-gains in 14 nations: what IQ-tests really measure. *Psychological bulletin*. 101(2): 171-191.

Flynn, 1991 – *Flynn, J.R.* (1991). Asian Americans. Achievement beyond IQ. Hillsdale, New Jersey: Lawrence Erlbaum associates.

Flynn, 1998 – *Flynn, J.R.* (1998). IQ gains over time: toward finding the causes (pp. 25-66). In U. Neisser (Ed.), The rising curve. Washington.

Flynn, 2006 – *Flynn, J.R.* (2006). Efeito Flynn: Repensando a inteligência e seus efeitos. C. Flores-Mendoza & R. Colom (Eds.), Introducao à Psicologia das Diferencas Individuais. Porto Alegre: ArtMed.

Flynn, 2007 – *Flynn, J.* (2007). What is intelligence? Cambridge: university press.

Flynn, 2008 – *Flynn, J.R.* (2008). Luria und das Paradox massiver IQ-Gewinne längs der Zeit (pp. 111-132). In Georg W. Oesterdiekhoff & Heiner Rindermann (Hrsg.), Kultur und Kognition. Hamburg & Münster: Lit-Verlag.

Fortune, 1963 – *Fortune, R.F.* (1963). Sorcerers of Dobu. New York: Dutton.

Frazer, 1994 – *Frazer, J.G.* (1994). The golden bough. Collected works, edited by Robert Ackermann. London.

Freitag, 1983 – *Freitag, B.* (1983). Der Aufbau kindlicher Bewusstseinsstrukturen im gesellschaftlichen Kontext, München.

Goodnow, Bethon, 1966 – *Goodnow, J., Bethon, G.* (1966). Piaget´s tasks: the effects of schooling and intelligence. *Child development*. 37: 573ff.

Greenfield, 1966 – *Greenfield, P.* (1966). On culture and equivalence. J. Bruner et al. (eds.), Studies on cognitive growth. New York: John Wiley.

Greenfield, 1998 – *Greenfield, P.* (1998). The cultural evolution of IQ (pp. 81-124). U. Neisser (Ed.), The rising curve. Washington.

Grissmer, 1998 – *Grissmer, D.W. et al.* (1998). Exploring the rapid rise in black achievement scores in the US (1970–1990) (pp. 251-286). In U. Neisser (Ed.), The rising curve. Washington.

Gustafsson, Undheim, 1996 – *Gustafsson, J.E., Undheim, J.O.* (1996). Individual differences in cognitive functions (pp. 186-242). In D. C. Berliner and R. C. Calfee (Eds.), Handbook of educational psychology. New York: Macmillan.

Habermas, 1976 – *Habermas, J.* (1976). Zur Rekonstruktion des Historischen Materialismus. Frankfurt am Main: Suhrkamp.

Hallpike, 1979 – *Hallpike, C.* (1979). Foundations of primitive thought. Oxford: at the Clarendon press.

Hallpike, 2004 – *Hallpike, C.* (2004). The evolution of moral understanding. London: Prometheus research group.

Hauser, 1998 – *Hauser, R.M.* (1998). Trends in black-white test-score differentials: I. Uses and misuses of NAEP/SAT data (pp. 219-250). In U. Neisser (Ed.), The rising curve. Washington.

Herrnstein, Murray, 1994 – *Herrnstein, R.J., Murray, C.* (1994). The bell curve: Intelligence and class in American life. New York: Free press.

Huang, Hauser, 1998 – *Huang, M.-H., Hauser, R.M.* (1998). Trends in black-white test-score differentials: II. The wordsum vocabulary test (pp. 303-334). In Neisser, U., (Ed.), The rising curve. Washington.

Ibarra, 2007 – *Ibarra, L.* (2007). Creencias, mitos y rituales en el mundo prehispánico. Una explicación desde la teoría histórico-genética. Guadalajara: Universidad de Guadalajara.

Inhelder, 1944 – *Inhelder, B.* (1944). Le diagnostic du raisonnement chez les débiles mentaux. Neuchâtel: Delachaux et Niestlé.

Irvine, Berry, 1988 – *Irvine, S.H., Berry, J.W.* (Eds.) (1988). Human abilities and cultural context. 2 vols. Cambridge, England: Cambridge university press.

Iwawaki, Vernon, 1988 – *Iwawaki, S., Vernon, P.E.* (1988). Japanese abilities and achievements (pp. 358-384). S.H. Irvine & J.W. Berry (Eds.), Human abilities in cultural context. Cambridge, England.

Jacob, 1997 – *Jacob, M.* (1997). Scientific culture and the making of the industrial west. New York: Oxford university press.

Kelly, 1977 – *Kelly, M.* (1977). Papua New Guinea and Piaget – an eight year study (pp. 169-202). In Dasen, Pierre (Ed.), Piagetian cross-cultural psychology. New York: Gardner press.

Kendall et al., 1988 – *Kendall, I.M. et al.* (1988). Test performance of blacks in South Africa. In S. H. Irvine & J. W. Berry (Eds.), Human abilities in cultural context. Cambridge, England.

Klich, 1988 – *Klich, L.Z.* (1988). Aboriginal cognition and psychology (pp. 453-486). S.H. Irvine & J.W. Berry (Eds.), Human abilities in cultural context. Cambridge.

Kohlberg, 1974 – *Kohlberg, L.* (1974). Studien zur kognitiven Entwicklung. Frankfurt am Main: Suhrkamp.

Lévy-Bruhl, 1923 – *Lévy-Bruhl, L.* (1923). Primitive mentality. New York: The Macmillan Press.

Lévy-Bruhl, 1931 – *Lévy-Bruhl, L.* (1931). Le surnaturel et la nature dans la mentalité primitive. Paris: Felix Alcan.

Lévy-Bruhl, 1938 – *Lévy-Bruhl, L.* (1938). L´éxperience mystique et les symboles chez les primitives. Paris: Felix Alcan.

Lévy-Bruhl, 1971 – *Lévy-Bruhl, L.* (1971). The ´soul´ of the primitive. Chicago: Henri Regnery.

Lévy-Bruhl, 1983 – *Lévy-Bruhl, L.* (1983). Primitive mythology. St. Lucia, New York, London: The university of Queensland press.

Lévy-Bruhl, 1985 – *Lévy-Bruhl, L.* (1985). How natives think. Princeton: university press.

Luria, 1982 – *Luria, A.R.* (1982). Cognitive development. Its cultural and social foundations. Harvard: university press.

Luria, 2002 – *Luria, A.R.* (2002). Kulturhistorische Humanwissenschaft. Ausgewählte Schriften. Hrsg. von Wolfgang Jantzen. Berlin: Verlag ProBusiness.

Lynn, Vanhanen, 2002 – *Lynn, R., Vanhanen, T.* (2002). IQ and the wealth of nations. Westport: Praeger.

Lynn, 2006 – *Lynn, R.* (2006). Race differences in intelligence. An evolutionary analysis. Augusta, Georgia: Washington summit publishers.

Maistriaux, 1955 – *Maistriaux, R.* (1955). La sous-évolution des noirs d´Afrique. Sa nature, ses causes, ses remèdes. *Revue de psychologie des peuples*. 10: 397-455.

Mair, 1969 – *Mair, L.* (1969). Magie im schwarzen Erdteil. München: Kindler Verlag.

Meisenberg, 2006 – *Meisenberg, G.* (2006). Challenging the belief in a (genetically) just world. *The mankind quarterly*. Vol. XLVII, fall & winter, 115-129.

Mogdil, Mogdil, 1976 – *Mogdil, S., Mogdil, C.* (1976). Piagetian research. Vol. 1-8. London.

Molnar, 2002 – *Molnar, S.* (2002). Human variation. Races, types, and ethnic groups. New Jersey: Prentice Hall.

Neisser, 1998a – *Neisser, U.* (Ed.) (1998). The rising curve. Long-term gains in IQ and related measures. Washington: American psychological association.

Neisser, 1998b – *Neisser, U.* (1998). Rising test scores and what they mean (pp. 3-24). Neisser, U., (Ed.), The rising curve. Washington.

Nijenhuis, 2012 – *Nijenhuis, Jan te* (2012). The Flynn effect, group differences, and g loadings. Personality and individual differences. 40: 1-5.

Oesterdiekhoff, 1997 – *Oesterdiekhoff, G.W.* (1997). Kulturelle Bedingungen kognitiver Entwicklung. Der strukturgenetische Ansatz in der Soziologie. Frankfurt am Main.

Oesterdiekhoff, 2000 – *Oesterdiekhoff, G.W.* (2000). Zivilisation und Strukturgenese. Norbert Elias und Jean Piaget im Vergleich. Frankfurt am Main: Suhrkamp.

Oesterdiekhoff, 2002a – *Oesterdiekhoff, G.W.* (2002). Das archaische Prozess- und Beweisrecht und die ´immanente Gerechtigkeit´. Erklärung von Struktur, Entwicklung und Untergang ordalförmiger Konfliktregelungen. In Zeitschrift der Savigny-Stiftung für Rechtsgeschichte – Germanistische Abteilung, 1.

Oesterdiekhoff, 2002b – *Oesterdiekhoff, G.W.* (2002). Ordale und Erfolgshaftung im Lichte des strukturgenetischen Ansatzes (pp. 175-189). In Jürgen Weitzel (Hrsg.), Hoheitliches Strafen in der Spätantike und im frühen Mittelalter. Köln & Weimar & Wien: Böhlau Verlag.

Oesterdiekhoff, 2005 – *Oesterdiekhoff, G.W.* (2005). Entwicklung der Weltgesellschaft. Von der Steinzeit zur Moderne. Hamburg & Münster.

Oesterdiekhoff, 2006a – *Oesterdiekhoff, G.W.* (2006). Kulturelle Evolution des Geistes. Die historische Wechselwirkung von Psyche und Gesellschaft. Hamburg & Münster & London: Lit-Verlag.

Oesterdiekhoff, 2006b – *Oesterdiekhoff, G.W.* (2006). Archaische Kultur und moderne Zivilisation. Hamburg & Münster.

Oesterdiekhoff, 2006c – *Oesterdiekhoff, G.W.* (2006). Irrationale Denk- und Verhaltensweisen am Beispiel von Hexerei und Magie und ihr Stellenwert in der Kulturgeschichte der Menschheit. *Sozialwissenschaftliches Journal*. Jg. 1, H. 2: 79-104.

Oesterdiekhoff, 2006d – *Oesterdiekhoff, G.W.* (2006). Kognitive Entwicklung und sozialer Wandel. Zur Wechselwirkung von Psyche und Gesellschaft im Lichte der strukturgenetischen Soziologie. *Sozialwissenschaftliches Journal*. 1(1): 9-37.

Oesterdiekhoff, 2007a – *Oesterdiekhoff, G.W.* (2007). Die Entstehung der Industriemoderne in Europa. Der strukturgenetische Erklärungsansatz. *Sozialwissenschaftliches Journal*. Jg. 2, H. 1, April, 9-35.

Oesterdiekhoff, 2007b – *Oesterdiekhoff, G.W.* (2007). The spread of AIDS in developing countries. A psycho-cultural approach. (with Heiner Rindermann). *The journal of social, political, and economic studies*. Vol. 32. Number 2: 201-222.

Oesterdiekhoff, 2007c – *Oesterdiekhoff, G.W.* (2007). Ancient sun cults: Understanding religious rites in terms of developmental psychology. *The mankind quarterly*. 48(1): 99-116.

Oesterdiekhoff, 2008a – *Oesterdiekhoff, G.W.* (2008). Kulturgeschichte der Menschheit und kognitive Entwicklung. In Oesterdiekhoff, G. W. & H. Rindermann (Hrsg.), Kultur und Kognition. Hamburg & Münster: Lit-Verlag, 19-56.

Oesterdiekhoff, 2008b – *Oesterdiekhoff, G.W.* (2008). Magic and animism in old religions. The relevance of sun cults to the world-view of traditional societies. *Croatian journal of ethnology* (Nar. umjet.), 45, 1: 43-66.

Oesterdiekhoff, 2009a – *Oesterdiekhoff, G.W.* (2009). Mental growth of humankind in history. Norderstedt: Bod.

Oesterdiekhoff, 2009b – *Oesterdiekhoff, G.W.* (2009). Psyche und Gesellschaft in der Entwicklung. Norderstedt: Bod.

Oesterdiekhoff, 2009 – *Oesterdiekhoff, G.W.* (2009). Trials against animals. A contribution to the developmental theory of mind and rationality. The mankind quarterly, spring & summer, no. 3 & 4: 346-380.

Oesterdiekhoff, 2009d – *Oesterdiekhoff, G.W.* (2009). The arena games in the Roman empire. A contribution to the explanation of the history of morals and humanity. *Croatian journal of ethnology (Nar. Umjet.)*. 46(1): 177-202.

Oesterdiekhoff, 2010 – *Oesterdiekhoff, G.W.* (2010). Entwicklungspsychologie als Historische Anthropologie. Das Verhältnis von Sein und Bewußtsein in der Weltgeschichte (pp. 253-266). Jüttemann, Gerd (Hrsg.), Konkrete Psychologie. Lengerich. Miami: Pabst science publishers.

Oesterdiekhoff, 2011a – *Oesterdiekhoff, G.W.* (2011). The steps of man towards civilization. The key to disclose the riddle of history. Norderstedt: Bod.

Oesterdiekhoff, 2011b – *Oesterdiekhoff, G.W.* (2011). La sociología genético-estructural como heredera de la sociología clásica y de la teoría de la civilización (pp. 71-96). V. Weiler (directora académica), Norbert Elias y el problema del desarrollo humano. Bogotá, Colombia: Ediciones Aurora.

Oesterdiekhoff, 2012a – *Oesterdiekhoff, G.W.* (2012). Die geistige Entwicklung der Menschheit. Weilerswist: Velbrück.

Oesterdiekhoff, 2012b – *Oesterdiekhoff, G.W.* (2012). Die Entwicklung der Menschheit von der Kindheitsphase zur Erwachsenenreife. Wiesbaden: Verlag für Sozialwissenschaften.

Oesterdiekhoff, 2016a – *Oesterdiekhoff, G.W.* (2016). Developmental psychology as answer to the question: Can the human disciplines achieve scientific foundations comparable to biology in consequence of Darwin, or to physics in consequence of Newton and Einstein? *European Journal of Psychological Studies*. Vol. 8. Is. 2. Pp. 68-107.

Oesterdiekhoff, 2016b – *Oesterdiekhoff, G.W.* (2016). Child and ancient man. How to define their commonalities and differences. *American Journal of Psychology*. Vol. 129. No. 3, pp. 297-314.

Oesterdiekhoff, 2017 – *Oesterdiekhoff, G.W.* (2017). What went wrong with cross-cultural psychology over the last 40 years? The developmental approach in opposition to two main ideologies of our time, cultural relativism and universalism of mind. *Human Evolution*. Vol. 32. No. 1-2, pp. 95-138.

Oesterdiekhoff, 2018a – *Oesterdiekhoff, G.W.* (2018). The first scientific revolution. Developmental psychology as the fundamental theory to all human and social sciences. *Human Evolution*. Vol. 33. No. 1-2, pp. 53-86.

Oesterdiekhoff, 2018b – *Oesterdiekhoff, G.W.* (2018). Once humankind spoke like children do. Developmental psychology explains the history of language. *Human Evolution*. Vol. 33, No. 1-2, pp. 87-113.

Oesterdiekhoff, 2018c – *Oesterdiekhoff, G.W.* (2018). Evolution of mind and language. Learning from the Pirahã case. *Anthropos*. 113, 1: 195-216.

Oesterdiekhoff, 2018d – *Oesterdiekhoff, G.W.* (2018). The nature of religion. The cognitive-developmental approach as the grand theory of religion. *Russian Journal of Sociology*. 4(1): 10-27.

Oesterdiekhoff et al., 2019 – *Oesterdiekhoff, G.W., Dux, G., Hummell, H.-J.* (2019). The development of painting in history. Psychological stages and sequential epochs. *International Journal of Anthropology*. 34, 3-4: 157-180.

Oesterdiekhoff et al., 2020 – *Oesterdiekhoff, G.W., Hummell, H.-J., Rüsen, J.* (2020). The European miracle. Psychological stages and the origin of modern society. *Journal of Social Sciences*. Vol. 16, pp. 84-99.

Oesterdiekhoff, forthcoming – *Oesterdiekhoff, G.W.* (forthcoming). Traumzeit der Menschheit. Wesen, Ursprung und Untergang der Religion.

Parin, 1978 – *Parin, P.* (1978). Fürchte Deinen Nächsten wie Dich selbst. Frankfurt am Main.

Peluffo, 1967 – *Peluffo, N.* (1967). Culture and cognitive problems. *International journal of psychology*. Vol. II, no. III.

Philp, Kelly, 1974 – *Philp, H., Kelly, M.* (1974). Product and process in cognitive development. *British journal of educational psychology*. 44: 248ff.

Piaget, 1932 – *Piaget, J.* (1932). The moral judgment of the child. New York: The free press.

Piaget, 1950 – *Piaget, J.* (1950). The psychology of intelligence. London: Routledge & Kegan.

Piaget, 1959 – *Piaget, J.* (1959). The child´s conception of the world. New York: Littlefield, Adams & Co.

Piaget, 1969 – *Piaget, J.* (1969). The child´s conception of physical causality. Totowa, New Jersey.

Piaget, 1974 – *Piaget, J.* (1974). Need and significance of cross-cultural studies in genetic psychology (pp. 299-310). P. Dasen & J. Berry (Eds.), Culture and cognition. London.

Piaget, 1975 – *Piaget, J.* (1975). Gesammelte Werke. Zehn Bände. Stuttgart.

Piaget, 1975b – *Piaget, J.* (1975). The origin of the idea of chance in children. New York.

Piaget, 1976 – *Piaget, J.* (1976). Autobiographie (pp. 15-59). Jean Piaget. Werk und Wirkung. München: Kindler Verlag.

Piaget, Bärbel, 1941 – *Piaget, J., Bärbel, I.* (1941). Le développement des quantités physiques chez l´enfant. Neuchâtel: Delachaux & Niestle.

Piaget, Bärbel, 1958 – *Piaget, J., Bärbel, I.* (1958). The growth of logical thinking from childhood to adolescence. New York: Basic books.

Piaget, Bärbel, 1969 – *Piaget, J., Bärbel, I.* (1969). The psychology of the child. New York: Basic books.

Piaget, Rolando, 1989 – *Piaget, J., Rolando G.* (1989). Psychogenesis and the history of sciences. New York.

Pintner, 1931 – *Pintner, R.* (1931). Intelligence testing: methods and results. New York: Henry Holt & Co.

Pomeranz, 2000 – *Pomeranz, K.* (2000). The great divergence. China, Europe, and the making of the modern world economy. Princeton: University press.

Poortinga, 1977 – *Poortinga, Y.H.* (1977). Basic problems in cross-cultural psychology. Amsterdam & Lisse.

Porteus, 1937 – *Porteus, S.D.* (1937). Primitive intelligence. New York.

Raven et al., 1993 – *Raven, J., Raven, J.C., Court, J.H.* (1993). Manual for Raven´s progressive matrices and vocabulary scales. Oxford: Oxford psychologists press.

Rindermann, 2008a – *Rindermann, H.* (2008). Wechselwirkungen zwischen Intelligenz und Gesellschaft aus Perspektive der psychometrischen Intelligenzforschung (pp. 165-208). In Georg W. Oesterdiekhoff & Heiner Rindermann (Hrsg.), Kultur und Kognition, Hamburg & Münster: Lit-Verlag.

Rindermann, 2008b – *Rindermann, H.* (2008). Relevance of education and intelligence at the national level for the economic welfare of people. *Intelligence*. 36: 127-142.

Rindermann, 2008c – *Rindermann, H.* (2008). Relevance of education and intelligence for the political development of nations. *Intelligence*. 36, 4: 306-322.

Sarich, Frank, 2004 – *Sarich, V., Frank, M.* (2004). Race. The reality of human differences. Boulder, Colorado: Westview Press.

Schöfthaler, Goldschmidt, 1984 – *Schöfthaler, T., Goldschmidt, D.* (Hrsg.) (1984). Soziale Struktur und Vernunft. Frankfurt am Main: Suhrkamp.

Schröder, 1989 – *Schröder, E.* (1989). Vom konkreten zum formalen Denken. Bern: Huber.

Singer, 2002 – *Singer, W.* (2002). Der Beobachter im Gehirn. Frankfurt am Main: Suhrkamp.

Smooha, 1978 – *Smooha, S.* (1978): Israel: pluralism and conflict. Berkeley: university of California press.

Sowell, 1994 – *Sowell, T.* (1994). Race and culture. A world view. New York: Basic books.

Spencer, Gillen, 1899 – *Spencer, B., Gillen, F.C.* (1899). The native tribes of central Australia. London: Macmillan.

Staewen, 1991 – *Staewen, C.* (1991). Kulturelle und psychologische Bedingungen der Zusammenarbeit mit Schwarzafrikanern. München: Weltforum Verlag.

Steinen, 1894 – *Steinen, Karl von den* (1894). Unter den Naturvölkern Zentral-Brasiliens. Berlin.

Stern, 1924 – *Stern, W.* (1924). Psychology of early childhood up to the sixth year of age. New York: Holt.

Sternberg, Rivkin, 1979 – *Sternberg, R., Rivkin, B.* (1979). The development of analogical reasoning processes. *Journal of experimental child psychology*. 27: 195-232.

Storfer, 1990 – *Storfer, M.D.* (1990). Intelligence and giftedness: the contributions of heredity and early environment. San Francisco: Jossey-Bass.

Tuddenham, 1948 – *Tuddenham, R.D.* (1948). Soldier intelligence in World Wars I and II. *American psychologist*. 3: 54-56.

Tuddenham, 1969 – *Tuddenham, R.D.* (1969). A Piagetian test of cognitive development (pp. 49-70). In W.B. Dockerell (Ed.), On intelligence. Toronto: Oise press.

Tylor, 1871 – *Tylor, E.B.* (1871). Primitive culture. 2 vols., London: J. Murray.

Vernon, 1969 – *Vernon, P.E.* (1969). Intelligence and cultural environment. London: Methuen & Co.

Werner, 1979 – *Werner, E.E.* (1979). Cross-cultural child psychology. Belmont.

Werner, 1948 – *Werner, H.* (1948). Comparative psychology of mental development. New York: Follet.

Zeininger, 1929 – *Zeininger, W.* (1929). Magische Geisteshaltung im Kindesalter und ihre Bedeutung für die religiöse Entwicklung. Leipzig: Barth Verlag.