

The creation of the matter of life by Oesalanus (a principal scheme of technology)
 Eluainete loomine Óselanuse järgi (tehnoloogia põhimõtteline skeem)

Dedicated to Ivar Ugi's 65th birthday

THE DISCOVERY OF THE UGI-DUGUNDJI MATHEMATICAL LANGUAGE IN CHEMISTRY

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Abstract. A short *humorous vision and memoirs* of the discovery of a new mathematical formal language in chemistry by Ivar Ugi and James Dugundji, as well as its computerization and application to complicated chemical problems by multicomponent reactions planning and creation (*an essay*).

Key words: Ivar Ugi, James Dugundji, Bible, mathematics of chemical formal languages, computer chemistry, multicomponent reactions, alchemy, art, history, humour.

Pühendatud Ivar Ugi 65. sünnipäevale

UGI-DUGUNDJI MATEMAATILISE KEELE AVASTAMINE KEEMIAS

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Annotatsioon. *Humoristlikud memuaarid ja nägemus* Ivar Ugi ja James Dugundji uue matemaatilise formaalkeele avastamisest keemias, selle kompuutrimisest ning kasutamisest keeruliste mitmekomponentsete reaktsioonide plaanimis- ja loomisprobleemide lahendamisel (*essee*).

Võttesõnad: Ivar Ugi, James Dugundji, piibel, keemia formaalkeelte matemaatika, arvutikeemia, mitmekomponentsed reaktsioonid, alkeemia, kunst, ajalugu, huumor.

THEORETICAL

The highly learned and esteemed
IVAR UGI The Oeselanus and his "BIBLE"

Chapter 1. PROLOGUE

1. A. D. MCMXXX on the island of Oesel of Moon-sund¹ IVAR, the son of UGI, came into the world. And in the Congregation of Tornimäe of the island of Oesel he was given the Christian name IGOR².
2. But then came there the Great WAR of the Worlds. And the young Ivar Ugi had to wander away with his parents to the Land of Alemanni³.
3. And there he was to study many teachings of *humanities* and *natural sciences*. And among them were also chemistry and mathematics that he learnt very thoroughly.
4. And when he in the town of Munich had found his "one-pot" reaction [2], U(gi)MCR-4⁴, he boiled there several hundred *basic substances of life*⁵ [4].
5. But a generation ago Men of Science had declared *the making of life substances*⁶ *an art* that was also *accepted* [5] by the Scientific Congregation of Mary's Land⁷.
6. At that very time Ivar Ugi, who had gone to the Land of America, met in the town of Los Angeles the mathematician-topologist James Dugundji. And there they wanted to explain the art of the "one-pot" chemistry found by Ugi to the computer.
7. But it is known *since Adam* that the computer is the *world's unspeakably insensitive Doubting Thomas*. And that chemistry and art are but *hellish imps*.
8. Because as men always used *beer* and *wine* with *food*, then *alchemists* in the land of Muhammad exorcized *the spirit* from these gifts of God [7].

¹ The Scandinavian synonyms of Saaremaa Island and the West-Estonian Archipelago (the Strait of Muhu) [1].

² IGOR = the Byzantine synonym of IVAR.

³ Germany.

⁴ Multicomponent reaction [3].

⁵ Organic compounds.

⁶ Organic synthesis.

⁷ The Roman Catholic Church's synonym of Estonia [1, 6].

- And from them came *Scotch* and *vodka* that were drunk only with *water*. And they brought much trouble into the world.
9. And when men started to shape *figures* of clay and stone, then *Goya* painted the *devil's pictures*. And they were after the likeness of *horned cattle and naked virgins* [8].
 10. And from these *misdemeanours* were born *chemistry* and *art*.

Chapter 2. A STORY OF THE CREATION OF THE "BIBLE"

11. But when *God* saw that *He* must reveal himself to *Man*, *He* took the "ONE - LANGUAGE POT". And put his PARABLES⁸ and TEN COMMANDMENTS⁹ into it.
12. But in *Babel* the *witless* men made a *pretty kettle of fish* of it. And thereafter everyone took to oneself a piece of it that they then baptized the *religion* and *mother tongue* of *their own*. And many misunderstandings and wars came of it into the world.
13. And there in *Los Angeles* these two men of science of the *true religion* realized that they had been on the wrong track by *cramming* chemistry for art to the computer that was still *poor in wit*.
14. And then they *were revealed* that chemistry is not an art but an incalculable *LANGUAGE*. And they were also *revealed* A *PARABLE* of this language for *molecules* in the *language of the mathematical matrix, algebra* [9]

$$B(\text{egin}) + R(\text{eaction}) = E(\text{nd})^{10}.$$
15. And when they *had declared* this *WORD* to the computer, this *unwise creature* started, to the great *amazement* and *joy* of its teachers, to *compute* Ugi's chemistry. Because it has been trained *since birth to obey* only *command* and *prohibition* that were also put into the PARABLE.
16. It was known to *Ivar Ugi* that since time *immemorial* alchemists and other renegades of science had devised all kinds of *heresies* for making *metals* that were *useless* to man's *body* or *very toxic* (*As, Pb, Hg, U²³⁵, Np, Pu*), as well as *harmful* to his *soul* (*Au, Ag*), and other "*aquae vitae*" [10, 11].

⁸ Semantics.

⁹ Syntax.

¹⁰ B, substance of the beginning; E, substance of the end; R, *command* and *prohibition* of the reaction (the original meaning "*resistance*").

17. And to prevent these *satanic substances* from getting into the teaching of the *language of fluidal and uncontrolled valence electrons* of the computer's *virginally pure* memory, then these two diligent men of science put down the "BIBLE" [12] for the computer and its disciples. And it was written there:

$$\begin{aligned} \text{B(ond) + R(eaction)} &= \\ &= \text{E(lectron) PARABLE and 18}^{11} \text{ COMMANDMENTS}^{12}. \end{aligned}$$

18. And when they *explained* the new Teaching to the computer, this very *brainless creature* started under the *guidance* of its teachers to *think out* and *predict* new *creations of life substances*.

Chapter 3. A STORY OF EVANGELS AND PHARISEES

19. And when Ivar Ugi came back to the Land of Alemanni, he would have many disciples and followers. And *explaining* the "BIBLE" they put down new *computer evangels*¹³ RAIN (PURE), IGOR-1, and IGOR-2 [12].

20. And by means of the "Bible" and "evangel" the Prophet of chemistry Ivar Ugi and his disciples succeeded in clearing the *Ugi-Dugundji Teaching* from *toxic substances* [10, 11] and "viruses" of heresies. And then they together with the *blessed computers* created *unforeseen* and *highly praised* new "*one-pot*" *polychemistries*¹⁴ UMCR-5, UMCR-7, and UMCR-11 [13, 14].

21. And when they had been *delivered* of this, Ivar Ugi's *students* were yet *revealed* new PARABLES of computer chemistry for *electrons* that had *gone astray on the tracks* of HOMO and LUMO [12, 15-17].

$$\text{XB} + \text{XR} = \text{XE}^{15}.$$

¹¹ 18 COMMANDMENTS had to be taken into use to curtail the too high degree of liberty of the *Student's factor* in the ten COMMANDMENTS given to Man earlier, which had brought forth *Babel*.

¹² Theorem [12].

¹³ Computer programs.

¹⁴ That is the *transgression* of the COMMANDMENT but the "*forbidden fruit*" is *sweet* also to molecules, isn't it?

¹⁵ X denotes the indeterminacy of distribution of valence electrons between several atoms (that is *prohibited* by the COMMAND, though, but an *electron* is also *erroneous* - the author's remark).

And they also had to *delicately* explain this to *innocent computers*.

22. And it is known that since the beginning *Pharisees* of *Science* have wanted to *abuse and crucify* Ivar Ugi together with his "one-pot" chemistry and computer "B I B L E". But thanks to the *tireless missionary work* of the Prophet and his disciples in the world's countries they have had no success whatsoever.
23. And thereafter several *Drug Sects*¹⁶ in the Land of *America* have started to study UGI's chemistry [14], primarily probably only instead of the "*philosopher's stone*" of alchemy. But every new teaching spreads still over *stocks and stones*, doesn't it?
Amen.
24. And it may be *true* that *chemistry* is the *ART & LANGUAGE*¹⁷!

POST SCRIPTUM. *COLLEAGUES* FROM HIS NATIVE COUNTRY, WHERE HE WAS BORN AT *KURESSAARE*, THE CAPITAL OF *OESEL*¹⁸, A.D. *MCMXXX, IX, V.*, WISH IVAR UGI THE *OESELANUS*¹⁹ VITALITY AND CONTINUATION IN THE FIELD OF SCIENTIFIC WORK. SINCE NOBEL'LESS OBLIGDED.

Thanking. The authors *praise* and *bless* the highly esteemed Teacher of Universitas Tartuensis, Asst. Professor Dr. **Tullio Ilomets**, for the name the *Oeselanus* and for the adding of the letters of the *deceased Aureolus Philippus Theophrastus Bombastus an Hohenheim genannt Paracelsus* [10, 11] to UGI's Teaching [14]; as well as chemists and the Science Foundation of *Mary's Land* for *helping* this *essay* to come into the world.

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This LETTER includes 24 VERSES, a POST SCRIPTUM, and Thanking in the languages of the *lands of Albion and Mary*; A "HOLY PICTURE" of IVAR UGI, and REFERENCES which A.D. *MCMXCV* were put down by:

Koit Lääts, a chemist specialized in organic synthesis, emeritus professor;

¹⁶ Pharmaceutical corporations.

¹⁷ Because in the *beginning* when men wanted to *reveal* themselves to each other they *painted pictures* on the rocks (before *Babel*, and chemists [12] after it).

¹⁸ The town of Kuressaare, Saaremaa Island, Estonia [5].

¹⁹ One coming from the island of Oesel [5].

Riina Süld, a philologist;

the picture was made by:

Hugo Hiibus, a graphic artist, Estonia's Meie Mats (Our Bumpkin) A.D. MCMXCIII.

Anno LXV Ivar Ugi sünnist

TEOREETILINE OSA

Kõrgesti õpetatud ja austatud IVAR UGI ÓSELANUS ja tema "PIIBEL"

1. Peatükk. SISSE JUHATUS

1. A. D. MCMXXX Moonsundi Óseli saarel²⁰ tuli ilma IVAR, UGI poeg. Ja Óseli saare Tornimäe Koguduses anti temale ristimise nimeks IGOR²¹.
2. Kuid siis tuli Suur Maailmade SÕDA. Ja noor Ivar Ugi pidi ära rändama oma vanematega *allemannide maale*²².
3. Ja seal tuli temal läbi uurida paljusid keele ja looduse teaduste õpetusi. Ning nende seas olid ka keemia ja matemaatika, mis temale hästi selgeks said.
4. Ja kui ta oli Müncheni linnas üles leidnud oma "ühepaja" reaktsiooni [2] U(gi)MCR-4²³, keetis ta seal välja mitu sada *elu alusainet*²⁴ [4].
5. Aga Teaduse mehed olid inimpõlv tagasi kuulutanud *eluainete tegemise*²⁵ *kunstiks*, mida tunnistas ka *Maarjamaa*²⁶ Teaduse Kogudus [5].
6. Tolsinatsel ajal Ameerika maale läinud Ivar Ugi sai Los Angelese linnas kokku matemaatika topoloogia usku James Dugundjiga. Ja seal nemad tahtsid *raalile* ära seletada Ugi leitud "ühepaja" keemia kunsti.
7. Aga *iidamast-aadamast* saati on teada, et *raal* on üks maailma äraarvamatult tuim *Uskumatu Toomas*. Ja et keemia ja kunst on ühed *põrgu sigitised*.
8. Sest kui inimesed pruukisid *õlut* ja *veini* ikka toidu juurde, siis *alkeemikud Muhhammedi maal* ajasid

²⁰ Lääne-Eesti (Muhu väina) arhipelaagi ja Saaremaa skandinaavia vasted [1].

²¹ IGOR = IVAR'i bütsantsi vaste.

²² Saksamaa.

²³ *Multicomponent reaction* [3].

²⁴ Orgaanilised ühendid.

²⁵ Orgaaniline sünteet.

²⁶ Eestimaa vaste rooma-katoliku kirikus [1, 6].

nendest *jumala* andidest *vaimu* välja [7]. Ja sellest tulid *viski* ja *spiritus vini*, mida joodi ainult *veega*. Ja nemad tõid maailma palju häda.

9. Ja kui *inimesed* hakkasid voolima savist ja kivist *kujusid*, siis *Goya* tegi *kuradi piltisid*. Ja nemad olid *sarvloomade ja alasti neitsite nägu* [8].
10. Ja nendest *väärtegemistest* sündisid ilma *keemia* ja *kunst*.

2. Peatükk. "PIIBLI" SAAMISE LUGU

11. Aga kui *Jumal* nägi, et peab ennast Inimesele ilmutama, võttis *Ta* kätte "**ÜHE KEELE PAJA**". Ja pani sinna sisse oma TÄHENDAMISE SÕNAD²⁷ ja KÜMMET KÄSKU²⁸.
12. Aga *Paabelis* ajasid arutud inimesed selle segi nagu pudru ja kapsad. Ja pärast võttis igaüks omale ühe tüki, mille nemad siis ristisid *oma usuks* ja *oma ema keeleks*. Ja sellest tuli maailma palju arusaamatusi ja sõdasid.
13. Ja seal nendele kahele õiget usku teaduse mehele *Los Angeleses* sai selgeks, et nemad on olnud valel teel keemiat kunsti pähe tuupimises *raalile*, kes oli veel *vaimust vaene*.
14. Ja siis neile ilmutati, et *keemia* ei olegi *kunst*, vaid hoopiski ära arvamata *KEEL*. Ning neile sai ka ilmutatud selle keele TÄHENDAMISE SÕNA *molekulide* jaoks *matemaatika matriksi algebra keeles* [9]

$$B(\text{egin}) + R(\text{eaction}) = E(\text{nd})^{29}$$

15. Ja kui nemad olid seda SÕNA kuulutanud raalile, hakkas see mõistmatu olevus oma õpetajate suureks imestuseks ja rõõmuks *raalima* Ugi keemiat. Sest teda oli harjutatud sündimisest saati kuulama ainult *käsku* ja *keeldu*, mis olid ka pandud TÄHENDAMISE SÕNA sisse.
16. *Ivar Ugil* oli teada, et aegade algusest on *alkeemikud* ja muud teaduse usu salgajad välja mõtelnud igasugu *väärõpetusi* nii inimese *ihule* kasuta või väga mürgiste (*As, Pb, Hg, U²³⁵, Np, Pu*) kui ka tema *hingele* kahjulikkude (*Au, Ag*) *metallide* ning muude "*elueliksiiride*" tegemiseks [10, 11].
17. Ja et päästa nende saatanlike olluste sattumist *raali neitsilikult puhta mälu voolavate (fluidaalsete) ja kontrollimata valents(bond)elektronide*

²⁷ Semantika.

²⁸ Süntaks.

²⁹ B - alguse aine; E - lõpu aine; R - reaktsiooni käsk ja keeld (algtäheanduses *vastuhakkamine*).

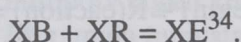
keele õpetuse sisse, siis need kaks usinat teaduse meest panid kirja raali ja selle jüngrite jaoks "PIIBLI" [12]. Ja selle sees olid kirjas:

B(ond) + R(eaction) =
= E(lectron) TÄHENDAMISE SÕNA ja 18³⁰ KÄSKU³¹.

18. Ja kui nad uue Õpetuse raalile olid ära seletanud, hakkas seesinantne ajast vaba olend oma õpetajate juhatusel **välja mõtlema** ja **ennustama** uusi **eluinete tegemisi**.

3. Peatükk. EVANGEELIUMIDE JA VARISERIDE LUGU

19. Ja kui Ivar Ugi tuli tagasi *allemannide maale*, sai tal olema palju jüngreid ja järelkäijaid. Ja nemad panid "PIIBLI" äraseletamisel kirja uued *raalievangeeliomid*³² RAIN (PUHAS), IGOR-1 ja IGOR-2 [12].
20. Ja "Piibli" ja "evangeeliiumide" abiga läks keemia Prohvet Ivar Ugil ja tema jüngritel korda *Ugi-Dugundji Õpetusest* välja rookida *valeõpetuste mürgised ollused* [10, 11] ja *viirused*". Ja siis nemad koos *õnniste* raalidega löid ilma *ennenägematud* ja *ülimalt kiidetud* uued *"ühe-paja" polükeemiad*³³ UMCR-5, UMCR-7, UMCR-11 [13, 14].
21. Ja kui nad sellega olid *maha saanud, ilmutati* Ivar Ugi *õpilastele* veel uued raalikeemia TÄHENDAMISE SÕNAD *elektronide* jaoks, kes olid *ära eksinud* HOMO ja LUMO teedel [12, 15–17]:



Ja mida nemad siis pidid *süüta raalidele ka delikaatselt* ära seletama.

22. Ja on teada, et *Teaduse Variserid* on tahtnud juba algusest saati Ivar Ugil koos tema "ühe-paja" keemia ja raali "PIIBLIGA" *ära teotada ja ristinaelutada*. Aga tänu Prohveti ja tema jüngrite väsimatule *missionitööle* ilma maades ei ole see neil tepe veel korda läinud.
23. Ja peale selle on *Ameerika maal* paljud *rohusektid*³⁵ *uurima hakanud* UGI keemiat [14], esialgu vist küll

³⁰ 18 KÄSKU tuli võtta tarvitusele, et kärpida varem inimesele antud 10 KÄSU *Studenti faktori* liiga suurt vabaduse astet, millest tuli *Paabeli* segadus (kirja panija märges).

³¹ Teoreemi [12].

³² Kompuutriprogrammid.

³³ Mis on küll KÄSUST üle astumine, aga eks ka molekulidele maitse *"keelatud vili"*.

³⁴ Kus X tähendab valentselektronide jaotumise määramatust mitme aatomi vahel (mida küll KÄSK keelab, aga ka elektron on ekslik - kirja panija märges).

³⁵ Farmaatsiakorporatsioonid.

alkeemikute "*tarkade kivi*" asemel. Aga üks iga uus õpetus levib ikka üle kivide ja kändude.

Aamen.

24. Ja võib olla tõsi, et *keemia* on KEEL & KUNST³⁶ !?

POST SCRIPTUM. ELU JÕUDU JA JÄTKU
TEADUSE TÖÖ PÕLLUL IVAR UGI
ÓSELANUS³⁷ele SOOVIVAD KOLLEEGID TEMA
SÜNDIMISE MAALT, KUS TA TULI ILMA
ÓSELF³⁸ PEALINNAS KURESSAARES A. D. MCMXXX,
IX, V. SEST NOBLESSE OBLIGE.

TÄNAMINE. KIRJA panijad *kiidavad* ja *õnnistavad*
Tartu Ülikooli kõrgesti austatud õpetajat dotsent dr. **Tullio Ilometsa**
Óselanuse nime eest ja UGI Õpetusele [14] *õndsas Aureolus*
Philippus Theophrastus Bombastus an Hohenheim nimelt *Paracelsuse*
Kirjade [10, 11] lisamisest ning samuti *Maarjamaa* keemikuid
ja Teaduse Fondi selle KIRJA ilma aitamise eest.

— o —

Selles KIRJAS on 24 VERSUS't koos POST SCRIPTUM'i ja
TÄNAMISE'ga *Albionimaa* ja *Maarjamaa keeles*; Ivar
Ugi "PÜHA PILT" ja 17 KIRJA VIITA, mille A. D. MCMXCV:
kirja panid: **Koit Lääts**, orgaanik-süntheetik, emeriitprofessor;
Riina Süld, filoloog;
pilti pani: **Hugo Hiibus**, graafik, *Eesti Meie Mats* A. D. MCMXCIII.

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³⁶ Sest alguses, kui inimesed tahtsid endid ilmutada üksikeisole, maalisid nemad kaljudele pilte (enne *Paabeli* segadust, ja keemikud [12] peale seda).

³⁷ Pärinev Óseli saarelt (ceestik. lüh. saarlane).

³⁸ Eesti, Saaremaa [5].

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³⁹ "Der Irrgang der irrenden Ärzte" (in German); "Ära eksinud meedikute eksirännak" (in Estonian).

ОТКРЫТИЕ В ХИМИИ МАТЕМАТИЧЕСКОГО ЯЗЫКА УГИ–ДЮГУНДЖИ

Койт ЛЭЭТС, Хуго ХИИБУС, Риина СЮЛД

В юмористической форме (эссе) рассказано об открытии Иваром Уги и Джеймсом Дюгунджи нового формального математического языка в химии, о его компьютеризации и применении для разрешения сложных химических проблем при планировании и осуществлении мультикомпонентных реакций.