

## APPENDIX FOUR

### A Royal 'Haagse klok' "Severyn Oosterwijck Haghe met privilege"

Reviewed by Keith Piggott

#### LONGITUDE! SIMON DOUW VERSUS HUYGENS-COSTER.

In the Horological Journal edition (BHI, October 2009-March 2010)" I said, *"If space had permitted I should have submitted Simon Douw's remarkable also revealing Patent Application,..."*. Internet publishing provides that space. I continued, *"...accounting for Huygens' displeasure and paranoia, also his libels that still falsely colour modern opinion, (Huygens' Legacy, p.87)"*. Oosterwijck was there, he may have known Douw in Rotterdam before 1658.

Simon Douw is one of those awkward but important horologists who alone in 1658 stood against the tide and wrongly earned Huygens' excoriating libels, but he probably pre-empted Huygens' flawed Longitude timekeepers. Douw receives scant attention from historians, then mostly adverse - on the basis of Huygens' *"Oeuvres Complete", Vol.II, Correspondence 1658 (OC\_Nrs.)*. An English schoolboy might follow, *"De litigo inter horologiopaeos Costerum scillicet et plagiarium istum Roterodamensem quid sit, ex ruis intelligo."* (by expert witness Prof. Van Schooten to Huygens in October 1658 [<OC531>](#), when he also predicted an easy victory over Douw in the Courts [<OC534>](#)).

Several authorities correctly recite the import of expert evidence at The Court of The Netherlands, whose learned Judges accepted that Douw's system was different, even better. Yet it seems no authority ever identified Douw's core mechanism, which was confirmed as unique by the Upper Court on August 9th, 1658, [[OC\\_528](#) gives August 8th and 18th], following demonstration of his Invention to the Court's deputised examiner Mr Johannes van Gent on July 16th, (*"den 16en Julij lestleden"*), ie.1658. [Morpurgo, Op.Cit., gives July 19th, 1657, a misinterpretation of *"lestleden"*; or an earlier document that would change the History]. Mr Douw's hearing [<OC527>](#) was 364 days after Coster had obtained his 'Attache' (License) from the Provinces of Holland & West-Friesland, [<OC526>](#), after his 'Octrooi' (Patent) was granted by Judge Glass and other Deputies, under the Court's Small Seal, on June 17th, 1657. Douw is known to have examined Huygens' new pendulum systems, which he diminished succinctly in his own Patent Application.

September 1658 heralded a flurry of excitement. On the 20th day, Douw again set out his stall to the States of Holland & West Friesland. [<OC529>](#) Coster simultaneously entered a dubious complaint [<OC530>](#) alleging Douw *"in place of the usual 'onrust' (balance or foliot) had used a 'pendulum', or hanging 'slinger' (swinger)"*, ie.his Patent. And Christiaan Huygens published *"Horologium"*, wherein, without naming Douw, he made pointed references to plagiarism by Dutch clockmakers, (see Foreword to *"Horologium"* 1658).

October 1658 saw Huygens lining up expert witnesses and men of influence, one a nephew. Illuminating! With proceedings begun, Huygens complains to Piek, *"within a month or six weeks of my invention being assigned to Coster, he [Douw] craftily came to me and others to view my invention. After which with minor changes, not to improve but to worsen, so as to pretend himself to have developed a new invention."* [<OC532>](#) [Or, conversely, Douw being naturally curious to see the new - to compare his own device's attributes?]

Today, no clock by Simon Douw is known; I find that most curious, it is as if he has been excised from history, deliberately. Dutch Court papers described Douw as *"City clockmaker of Rotterdam... a master in the art of great tower, domestic or office clocks"*, (*"en meester in de kunst van groote Toorn, Camer ofte Comptoirwerken"*). Yet his mechanical insights, his escapement, also his drive mechanisms, are best, and now only, revealed by his Patent Grant on August 9th, 1658, and by the evidence and judgement in a claim and counter-claim started in the Provinces of Holland and West Friesland, but then referred to the Court of The Netherlands in October 1658, with a Judgement by Consent on December 5th, 1658. And that case went entirely in Douw's favour, against the highly favoured joint Complainants Huygens and Coster.

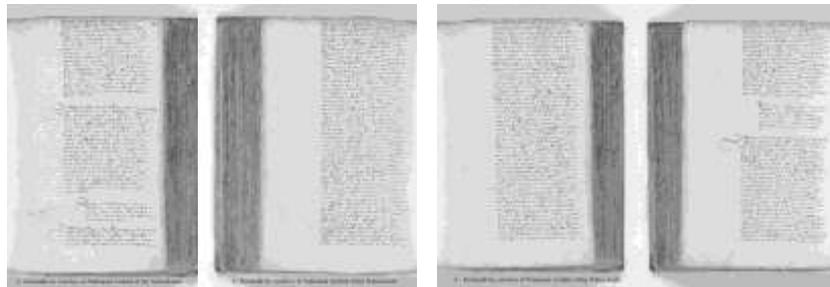
In itself, that is remarkable. Huygens, the Noble patrician, the most famous Dutch scientist, and the self-professed inventor of the pendulum clock, who had in the course of this trial published "*Horologium*", was forced by the judges to settle the case rather than face unfavourable verdict; also to concede *Consent*; also one-third *Royalties* to Douw. It would have been a crushing humiliation for Huygens, the seed of his libels. Subsequently, the Lower Court of Holland, Zeeland and Friesland confirmed to Douw, on December 16th and 19th 1658, their Upper Court's judgement by consent, (*comparitie en daading*) formally signed by the Procurators Gerrit van Velde and Wouter Goutappel on 9th December 1658 [<OC555-557>](#). That has always intrigued me and led to my long interest in Simon Douw and his advanced timekeeper.

By 1980 I had formed a view that Simon Douw, far from being the snooping, bribing, plagiarist that Huygens alleged, was in fact a fine horologist with an enquiring mind and empiric skills which led him to surprising insights, and correct deductions, about the implicit defects of the several Huygens-Coster pendulum systems then extant - even though not yet actually published in "*Horologium*" till September 1658, *and then only in very different 'OP' form*.

Unfortunately, the Huygens-Coster v. Douw 1658 Court papers, (NL.*proces-verbaal met daading*'), remain lost, so I draw upon their remarkable contents from other sources; ie. Court of The Netherlands' letters to Mr Simon Douw; J.Drummond Robertson, "*The Evolution of Clockwork*", (Op.Cit., pp.124-126); Dr.G.A.Volgraff, "*Christiaan Huygens, L'horloge a Pendule*", App.V, '*A L'Horologium de 1658*', pp.82-83 (The Hague, 1932); also R.D.Dobson \* "*De slinger als tijdmet*", (*The pendulum as timekeeper*), **Ch.2.2**, pp.29-32, **Ch.4.1**, p.62 (Achterland Verslag 1999). [Note. Dutch author J.J.Moerman fairly stated Douw's prominence as "*Rotterdam's competitor to Christiaan Huygens*", ([Rotterdam Courant](#) 1929). Whereas, A.J.Servaas van Rooijen, director of Hague Museum, in 1899 wrote in "*Eigen Haard*" ('*Own Hearth*'), see p.13 below), citing Huygens' formal complaint at Douw snooping at his invention in mid-1657 and April 1658; Frank J.Reith revived that story in, "*De 'Uitvinding' van Simon Douw*", (*TIJDSchrift*, #1,1998). Both repeat Huygens' defamations, but find no *Douw invention* nor the kernel of Douw's **Patents** (NL.*Octrooi*)]. \*In Richard we lost a keen horological intellect.

#### **DOUW'S 'OCTROOI' of August 9th, 1658.**

To enable and promote '*open research*', I reproduce the official manuscript of Simon Douw's less familiar Patent Application and Validation, (NL.*Octrooi*), dated August 9th, 1658. To enlarge, click on each page or page number;  
[p196 recto](#)                      [p196 verso](#)                      [p197 recto](#)                      [p197 verso](#)



**MS. Simon Douw's Patent Application with Grant (Octrooi) of 9/8/1658.**  
 By permission of Nationaal Archief, Nederland. Inventory 12311, pp.196-7, beginning at marginal note, "*Horlogieme*", probably in Volgraff's hand.

#### **TRANSCRIPTS**

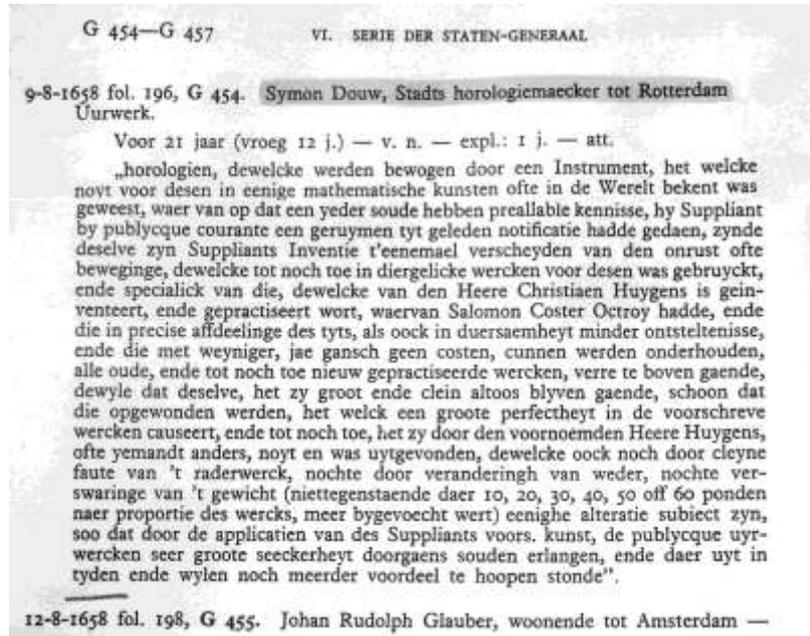
To read then to transcribe these old Dutch manuscripts, (and Huygens' own correspondence includes French, Latin, and Greek), requires the accumulated expertise of scholars or native authorities, beyond my ability. Fortunately, Martinus Nijhoff, editor of "*Oeuvres Complete*", also G.A.Volgraff and G.Doorman stepped into those roles. The famous Coster-Fromanteel Contract of Sept.3rd, 1657, ([HF Compilation](#)), saw modern researchers, first Berry van Lieshout, then K.van der Horst, W.A.van Klaveren, and others, devote their skills to effect, invaluable to ongoing research. Berry discovered earlier luminaries had all missed Coster's name in the '*secret*' clause. Reproduced here, in facsimile from *Oeuvres Complete*, is full transcript of Simon Douw's August 1658 "*Octrooi*", cited as 8th (sic) and also as 18th (sic), [<OC528>](#).

De Staten generael der Vereenichde Nederlanden allen den geenen die desen sullen sien ofte hooren lesen. Salut. doen te weten. Dat wy ontfangen hebben d'oormoedige Supplicatie aen ons geprefenteert, uyt den noem ende van wegen Meester Symon Douw, Stadshorologiemaecker tot Rotterdam, inhoudende, dat alsoo tot noch toe, veel moeyten en costen waren gespilt, om tot dienst van 't gemene beste, correcte ende welgaende horologien te maecken, ende deselve perfectheyt niet heeft kunnen werden uitgevonden, was hy Suppliant, en meester in de kunst van groote Toorn- ende Camerwercken synde, ter liefde van 't gemene beste bewogen geworden syn practyque ende arbeyt in 't werck te stellen, hebbende eyntelyck uitgevonden seeckere nieuwe inventie van horologien dewelcke werden bewogen door een Instrument, hetwelck noeyt voor desen in eenige Mathematische Consten ofte in de werelt bekent was gewoest, waervan, op dat een yeder soude hebben prealable kennisse, hy Suppliant by publycque courante: een geruymen tyt geleden Notificatie hadde gedaen, synde deselve syns Suppliants Inventie t'eenemaal verscheyden vanden onrust ofte beweginge, dewelcke tot noch toe, in dergelycke wercken voor desen was gebruyckt, ende specialyck van die, dewelcke van de heeren Christiaen Huygens was geïnventeert ende gepraetiseert wert, waer van Salomon Coster Oetroy hadde, ende die in preefse affdoelinge des tyts, als oock in duersaemheyt minder ontsketenisse ende die met weyniger iae gantsch geen costen, kunnen werden onderhouden, alle oude ende tot noch toe nieuwe gepraetiseerde wercken verre te hoven gaende, dewyle dat deselve, heefly groot ende cleyn, altoos blyven gaende, schoon dat die opgewonden worden hetwelcke een groote perfectheyt inde wercken causeert ende tot noch toe, het sy door den voornoemden heer Huygens, ofte yemant anders, noyt was uitgevonden. Dewelcke oock noch door cleyne fauten van 't raderwerck, nochte door verandering van weder, nochte verwarlinge van gewicht (niettegenstaende daer 10, 20, 30, 40, 50 off 60 ponden naer proportie des wercks, meer bygevoecht wierd:) eenige alteratie subleert syn, soo dat door de applicaten van des Suppliants voornoemde kunst de publycke uytwercken seer groote seeckerheyt doorgaens soude erlangen, en daer uyt in tyt ende wijlen noch meerder voordeel te hopen stonde, dewyle dan hy Suppliant soo dienstige nutte ende perfecte inventie geerne tot dienst van 't gemeene beste, nu wilde aen den dach brengen, indien wij hem Suppliant daer van gellefden te verleenen Oetroy voor den tyt van twaelf achterevolgende jaeren, met interdictie dat binnen den selven tyt, niemant onder het gebied van desen staet, soodanige soorten van horologiewerck, in 't geheel nochte ten deele, directelyck noch indirectelyck soude mogen naermacken, op seeckere groote poene bij ons daer toe te statueren. Welcken seengemerckt soo ist, dat wy ons ter beide van den voornoemden Suppliant genegen vindende, deselve geconsenteert, geaccordeert ende geoetroyeert hebben, consenteeren, accordeeren ende oetroyeeren mits desen dat hij alleen, ende met seclusie van allen anderen, voor den tyt van eenentwintich naestcomende achterevolgende jaeren in dese Vereenichde Nederlanden geassocieerde lantschappen, steden ende leden van dien, de voorszegde nieuwe inventie van horologiewerck sal mogen maecken, praetiseren, in 't werck stellen ende gebruycken, doen maecken, praetiseren, in 't werck stellen ende gebruycken, oock venten ende vercoopen, verbiedende oversulcx allen eenen iegelycken Ingesetenen vande voorszegde Vereenichde Nederlanden, geassocieerde lantschappen, steden ende leden van dien, binnen den voorszegden tyt van eenentwintich naestcomende jaeren, de voorszegde nieuwe inventie van horologiewerck, in 't geheel ofte ten deele, in 't groot ofte cleyn, naer te maecken, doen naer maecken, praetiseren ofte elders naegemaect hier te lande te brengen om vercoft ofte gebruyckt te werden, nochte oock enige wercken alreede gemaect synde, sonder syn Suppliants kennisse ende consent, volgens deselve Inventie te veranderen, alles opte verbeurte van alle de naergemaecte wercken ende Instrumenten ende daerenboven van een somme van drie hondert Caroli guldens t'appteeren een derdendeel daervan ten behoeven van den officier die de calange doen sal, het tweede derdendeel ten behoeven vanden armen, ende het resteerende derten deel ten behoeve van den voornoemden Suppliant, mits dat het sy eene nieuwe inventie, noyt voor desen hier te landen geïnventeert, gebruyckt ofte gepraetiseert, ende deselve inventie gebracht ende gestelt werde in volcomen perfectie binnen een jaer naer dato deser vallende, op poene van het verlies van desen onsen Oetroye, Ontbleden ende beveelen daeromme allen Officieren, Justicieren, Magistraten ende inwoonders van de voorszegde landen, Mitsgaders allen anderen, dien dit aengaan mach, dat sij den meergenoemden Suppliant doen ende laten genieten ende gebruycken, 't volcomen effect van desen onsen Oetroye, consent ende privilegie, Cesseerende alle belet ende wederseggen ter contrarie. Behoudelyck nochtans, dat hy Suppliant gehouden blyft, op desen onsen Oetroye te versoecken, oock obtineeren attache van soodanige Provincie off Provincien alwaer hy syne voorszegde nieuwe inventie sal willen praetiseeren ende in 't werck stellen.

Gegeven inden Hage, onder onsen Cachette, paraphure ende de signature van onsen Griffier open achtsten Augusti seften hondert acht en vyftigh, ende was geparapheert J. van Gent. Onder stont Ter ordonnantie van de Hooghgemelte Heeren Staten Generael, ende was onderreyckent Muysch.

In fact this 'Octrooi' was entered into the manuscript record on August, 9th, 1658, being undersigned by Mr Johannes van Gent, also by Mr Arend Muys van Holy. Despite his application seeking protection only for twelve years, "*to perfect his invention, in the public interest*", the Court of The Netherlands allowed Douw twenty-one years, and set a penalty for any infringements, at "*300 Caroli Guilders, divided between the Court, the poor, and Douw*"; with the condition that "*the instrument be brought to perfection within one year on penalty of loosing his Patent*". What exactly were the "*other more important advantages*" he anticipated? Longitude timekeeping, I suggest. Mr Douw, after all, was City Clockmaker to the thriving maritime port of Rotterdam.

Doorman's abridged transcript of Simon Douw's formal Octrooi covers only the relevant technical section of Douw's Applications. (see G.Doorman, "*Octrooijen en uitvindingen in de Nederlanden uit de 16e-18e eeuw*", VI. serie Der Staten-Generaal, Fol.196, G454, p.225). [<Douw G454>](#)



**Doorman's Abridged Transcript of Douw 'Octrooi', dated 9-8-1658.**

Naturally all these transcripts are in the original old Dutch, which even native Dutch speakers can find difficult. However, I translated the relevant technical sections into colloquial English - with some amendments suggested to me by Mr Erik Glasius. Errors in translation are mine alone; Dutch etymologists and linguists will provide any necessary corrections to the language, or sense.

9-8-1658 Fol.196 G454 Symon Douw, City clockmaker of Rotterdam

**Clockwork** For 21 years (requested 12 years) - v.n. - expl.: 1j - att

*"Clocks, being motived by an Instrument, which was never before known in any mathematical arts nor in the World, wherefore that everyone should have informed knowledge, a considerable time ago the Supplicant had given prior notice in the public broadsheets\* concerning the Supplicant's Invention totally different to the balance or oscillator hitherto used in these works, and especially different from that invented by Mr Christiaen Huygens, and put into effect by Patent granted to Salomon Coster; and which [Douw's] by exact divisions of time, in the long run reduces irregularities and with little or no costs can be maintained, therefore being superior to all old and new works used until now, whilst this be it large or small [clocks] always remains going provided it is wound, bringing great perfection in the aforementioned works, and which was not discovered by Mr Huygens nor anyone else. The aforesaid [Douw's again] is not subject to any alteration, neither by small faults in the wheelwork, nor by changing weather, nor by increase of its weight [drive], (notwithstanding that 10, 20, 30, 40, 50, or 60 pounds proportionally be added to the work), so that by application of the Supplicant's aforesaid art in public clocks their accuracy will be greatly improved, and eventually more advantages† are to be expected."*

\*Newspapers may repay research † Douw probably alluding to Longitude

During of the interrogatory stage of that litigation, on September 20th, 1658, Douw reminded the Lower and Upper Courts of his claims to a new Invention with its specification. He added that he has since also been granted another "*attache*" (license), now by the Province of Utrecht. <OC529>

Contrast Simon Douw's request with Salomon Coster's "*Octrooi*", (June 16th, 1657), when acting as Huygens' assignee with all rights: <OC525>

*"dat hem Suppliant door de heer Christiaen Hygens, in handen gestelt was, (om daer van tot zynen voordeel in te disponeren) seeckere nieuwe inventie van horologe, gaende door een beweginge zeer verscheyden van de geene, die tot noch toe in diergelicke werken is gebruyckt geweest, ende deselve in de precise affmetingh van den tyt verre overtreffende, aangesien datse noch door veranderingh van wederenige merckelycke alteratie subject is, soo dat niet alleen de publicque uerwerken door het appliceren van deselve, ongelyck meerder seeckerheit souden mogen vercrygen, maer oock in de astronomie, en elders, groot voordeel daer uyt te verwachten stonde."* License ('*attache*') was approved on July 16th, 1657.

<OC526> Colloquial translation gives the gist of the *technical* part;

"that the Supplicant delegated by Mr Christiaen Huygens to dispose to their advantage [profit] a truly new invention of a clock, going by an *oscillator* very different from and far surpasses those presently or formerly used, which measures time precisely, not being subject to repetitious nor noticeable irregularities, so that by its application not only do public clocks achieve greater accuracy but also astronomy, and furthermore great benefits† are to be anticipated". † Longitude is already mentioned in correspondence.

These transcripts, with professional translations, should found new research to re-examine the source documents that I implicitly accepted in first instance during my original research. I shall leave it to scholars of old Dutch to bring these documents, also '*Oeuvres Complete*', into English, to bring alive their lively correspondence and the high feelings aroused. Further background may be had from the surviving correspondence, (see CH, "*Oeuvres Complete*", Vol.II. Correspondence 1658, No.523-534, 557, etc.).

Obviously, the lack of any drawing, or details of construction, in Salomon Coster's also Simon Douw's manuscript Patents, makes for uncertainty about those mechanisms being patented. On those descriptions it is just not possible to make a sound judgement on their respective and necessarily *different* merits. But Coster's extant clocks and Huygens' preserved drawings, prove the methodology of all their several *Pendulum* systems. Whereas, Douw's oscillator system has no extant physical presence. Douw's '*Octrooi*' therefore has to be read in conjunction with evidence given by several expert witnesses in the Court of the Netherlands, also in perceptive observations by learned judges. My study of these documents led me to dramatic new conclusions.

Contained in the last paragraph of Doorman's transcript, are the key phrases that divorce Douw's '*new*' system from any *verge* escapement or *maintaining power* of the time, not excepting Huygens', (see Dobson, Op.Cit. p.28, fig.4). Most especially, no verge escapement could sustain isochronism with greatly increasing forces being applied; the "*Royal Pendulum*" *having dominion over the weight*, had not been invented. Those extra forces had to be disengaged from the escapement by some intermediate device. Then, the only devices to act in that singular way were Jost Burgi's '*Remontoirs*' - weight or spring operated. Couple Douw's spring-rewound remontoir, with his single vertical oscillator sensitive to any change in moment of contra-weighted ends, cited by Dutch Judges, must *derive* from Burgi's remontoirs and cross-beats

Below I quote an excerpt from my 1989-93 thesis touching on these events, quoting Professor Volgraff's transcript and explanation. He founded modern Huygens studies. (see Volgraff, G.A., "*Christiaan Huygens, L'horloge a Pendule*", App.V, Horologium of 1658, pp.82-83). On my own reading of these documents, I remark that, in marked contrast to Coster's allegation of plagiarism (<OC530>), both Simon Douw and the Netherlands' Courts refer to his "*onrust*" (unrest), being the Dutch equivalent of German "*Unruhe*", typically meaning *Balance* or *Foliot*; or refer to his "*beweginge*" (oscillator), but never once mention "*pendulum*". See Nomenclature.

### **Nomenclature:**

Here I must add a *caveat*. Due to the lack of any standard nomenclature in the period being examined, modern scholars must view early citations of '*pendulum*' with circumspection. [Conversely, as I have suggested elsewhere, John Evelyn's lack of any description of escapements, (Diary Nov.1, 1660 and Aug.9, 1661), like all other observers' silences, ie. *my dogs that did not bark*, probably indicates absence of the still novel *rapid-beating* pendulum.

It is worth recalling that, "*onrust*", "*beweginge*", "*pendulum*", and even "*horologium oscillatorium*" had no singular meaning, as is apparent from the 1658 litigation, also contemporary usage by Robert Hooke and many others. This is equally true of "*maintaining power*" mentioned in witness statements, in fact referring to a "*remontoire*". G.H.Baillie's invaluable bibliography, also some later horologists, cite several instances of confusion. Even in 1680, after publication of Huygen's "*Oscillatorium Horologium*", the Royal Society then misinterpreted a description by the Flemish astronomer Caspar Dons, to J.J.Becher, regarding Tycho Brahe's four great "*horologium oscillatorium*" by Jobst Burgi, to claim a pre-emption of Huygens, (G.H.Baillie, "*Clocks and Watches, An Historical Bibliography*", NAG Press Ltd. 1951, p.110). We now know that Burgi's clocks had horizontal, then vertical, *double-foliot*, then *double-balance*, "*cross-beat*" escapements - unrelated to the pendulum.

Drummond Robertson (Op.Cit. p.116 and pp.118-119) noted that Jean Baptiste van Helmont's essay "De Tempore" in "*Ortus Medicinae*" s51, says he used a *pendulum* to measure time; [almost certainly free, without any escapement, manually impulsed in the manner of Riccioli in 1642]; DR also noted Pierre de Caracavy's letters to Huygens, 13 Dec.1659 and 26 Feb.1660, mentioning a '*pendulum*' clock in Mr Boismorand's collection by a German at Angouleme circa 1615/16, probably by one Georg Kloss. This latter, being pre-Galilei's "*Discorsi*" (1638), probably is mistaken; and yet that is not inconceivable. Whereas, pendulum in the modern sense includes Reid's mention of the Grignons' claims for Richard Harris' *pendulum* conversion of a London church clock in 1642, four years after '*Discorsi*' was published in Amsterdam, so entirely feasible, (Thomas Reid, "*A Treatise on Clock and Watchmaking*", Edinburgh, 1826, p.179). Reid also noted that, in February 1656, to observe a solar-eclipse from Oxford, Dr.Seth Ward had urged his young assistant, **Robert Hooke**, "*to contrive an escapement for a pendulum*", (Reid, Op.Cit. p.184); and Johannes Hevelius' "*Machinae Coelestis*" (1673, Book 1, Chapt.XVII "*De Horologiis*", pp.360-372), is admirably clear, even in Latin, differentiating between free and mechanical, pendulums by Galilei, Huygens, and his own, from all the older oscillating systems like Burgi's. [Hevelius obliquely describes, one of Jost Burgi's clock escapements - which I have identified as BX3RV]. Unfortunately Hevelius does not cite any of the competing *pivoted-pendulums*, of Galilei, Fromanteel, Campani; which by then, like Huygens' way, were all made obsolete by Fromanteel's "*pendulum cross-beat*", also his acolytes' "*tic-tac*" and "*anchor*" escapements - but Danzig was a long way from London, and Hevelius had been unaware of Huygens' pendulum till he received "*Horologium*", congratulating Huygens.

### **TRANSLATIONS AND PERSPECTIVES:**

Here I stake out my ground, in my 1989-1993 research into the rediscovered relic of Fromanteel's 1649 Solar and Musical Spring Clock for Mr.Dudley Palmer of Gray's Inn, by quoting an extract from my revised thesis; "***Emerging From The Shadows, The True Patriarch of English Clockmaking, Ahasuerus Fromanteel The Elder***", pp.92-95, Part V. *Burgi's Cross-Beats and Remontoirs; Fromanteel's; Douw's; Addendum 1-3-96.* (Antiquarian Horological Society and private circulation).

### **PART V. "Re-Interpreting Douw's Construction:"**

But perhaps absolute proof of Huygens' ignorance of Burgi may be at the Court of Holland in 1658. The case of "*Coster & Huygens v. Douw*" is well known, but I suggest it also reveals Huygens' misunderstanding of Douw's escapement - or his willingness to mislead a Court? Both Vollgraff and Robertson summarised witnesses' depositions held in the Hague archives [now mislaid]; Morpurgo and Plomp also give brief details. In the context of

Huygens, their selected quotations are revealing; but in the context of Simon Douw, I believe all these authors missed their real significance; Douw's, so called, 'pendulum' was not a plagiarism of Huygens but of Burgi, or Fromanteel? These depositions must be investigated, The Hague's archives must find these -horologically vital- court records.

It is agreed, Huygens and Douw each received a patent from the States-General of The Netherlands, [Holland is only one province]. Huygens' pendulum "octrooi met privilege" (patent with licence) was simultaneously assigned to Salomon Coster of The Hague, on 16th June 1657, who soon after took on John Fromanteel, (as notarised on 3rd September 1657). Then on 16th July 1657, he obtained the necessary "attache" (validation?) to enforce his patent in Staten-Holland, the province for The Hague. [Robertson says Gelderland, where Huygens had also granted Jan Van Call a "privilege" (licence)]. Then Simon Douw of Rotterdam obtained his "octrooi" for his new timekeeper, also at the Staten-Generaal, on August 9th, 1658. [Morpurgo, Op.Cit., gives 19th Aug.1657].

Mr Huijbrecht of Rijksarchief clarified this case's formal aspects for me. Evidently, Douw had applied for an "attache" in the province of Holland. That sparked off claims by Coster and Huygens on the one hand, then counter-claim by Douw on the other. The case began at Staten-Holland, but as a complicated matter was referred to the Court of The Netherlands, 20-9-1658. Huygens waspishly alludes to this dispute in "Horologium", published in September 1658, but by his remarks on plagiarism shows he misunderstood Douw's patent. The case was heard on 9th October 1658, and following days, when witnesses were called. The parties eventually reached agreement and a judgement, by consent, was pronounced on 9th December 1658. Remarkably, one might think, Parties agreed that any profits on "pendulums" sold in [the province of] Holland would be shared by all three; and Douw also obtained his "attache" for the Province - now unopposed.

Fortunately for us, the court had each invention examined by experts. Huygens called Professor Frans van Schooten, a noted mathematician. But with depositions now being lost I rely upon commentaries by Vollgraff and Robertson. Being "pre-Von Bertele" they missed the significance of Douw's wager with Schooten, to calculate the pendulum beat of the wheel train - highly sensitive to any movement of its foliot bob. Undisputedly, Douw's so called "pendulum" had an upper extension with counter-poisés at both ends, "a vertical staff vibrating around a central point between two weighted ends". His so called "pendulum" had no swinging action - both ends described a circular motion and turned around a central pivot. Huygens' pendulum was not so constructed [nor was Galileo's], but Burgi's and Fromanteel's twin oscillators were; Douw's oscillator was not a pendulum but a vertical foliot. On that evidence it may derive from Burgi's 'BX3' (or 'BX3RV', see below). Had Douw knowledge of Burgi, via Bramer, Schwartz, or Fromanteel? Did Douw retain twin pallet-staffs, as in my conjectured Burgi Uranienborg variant, ie. for my putative proto "single-foliot cross-beat"? Any evidence is semantic.

Douw called Benjamin Lisle and Johannes van der Thoorn, clock makers of Rotterdam. They each testified that; Douw's construction was very different to Huygens' (true) pendulum; and Douw's clock had "maintaining power" very different to Huygens' (endless rope), ie. being "a new and extraordinary rare invention, which so far as they are aware has never before been employed in any works". These two witnesses added, if they were at liberty to make any clocks they would prefer Douw's to Huygens'. Affidavits by brothers Adriaan and Johannes Roussel, and Van Nieuwenhove, all clock makers, confirmed both those findings and opinions. Possibly, in the vaguer terminology of the day, Douw's new "maintaining power" may be an unrecognised form of "remontoir". If so it must be noted as curious, at least, that Huygens did not allege Burgi's priority then, nor in 1664, did he disclose Douw's 1658 'remontoir' to Moray, or, (to be pedantically semantic), only quite obliquely.

From the parties' positions, I infer Huygens was ignorant of Burgi's remontoir cross-beats, as even Johannes Hevelius' oblique description was not published until 1673, ("*Machinae Coelestis*", *Chapt.XVII, De Horologiis*, p.367); and from expert evidence also deliberations by the Court of the Netherlands, I infer that Douw's oscillator was a single-beam cross-beat with a spring-remontoir. I quote Vollgraff's fuller transcription (n.152); "*nous y*

voys en outre que le poids superieur du pendule de Douw pouvait etre regle par une vis (on sait que Huygens avait introduit dans ce but une vis dans son horologe de 1657;) et que s'engagea a payer mille florins a van Schooten s'il se montrait capable de calculer combien la marche serait alteree par un deplacement de ce poids superieur, ("hetselve instrument het horologie tot onze verwonderinge in soo egalen gang sonder veranderinge gecontinueert wort, dat geen mathematicus daer van de proportie sal connen uytrekenen, als door een indivisible beweginge van de Cnoop op't bovenste van't instrument geschroeft de gangh van't horologie grotelijcx verhaest oft vertraecht en in de perfectie gebracht wert, mitsgaders oock de Heere Professor van Schoten als onpartijdig mathematicus bij de wederpartie genomineert ende op de comparitie present - hoewel Mr.Douw tot recompense duysent guildens belooffde - die uytrekeninge niet begeerde aan te nemen")." The Court's considerations, in parentheses, of Douw's 'pivoting' oscillator translates; "to our amazement this same instrument maintained the clockwork in such equal beat without alteration, in which proportions no mathematician can determine, as by any minute screwing movement to the upper bob of this instrument the clock's beat is greatly hastened or retarded to correct it to perfection, whereas despite Mr Douw's reward offer of one thousand guilders even the independent mathematical expert Professor Van Schooten nominated by the complainants and also present at this settlement did not desire to [could not] make this calculation". (G.A.Volgraff, "Christiaan Huygens, L'horloge a Pendule", App.V, Horologium of 1658, pp.82-83).

The case was lost!

Huygens and Coster then had to settle! The Court's description infers the moveable upper bob of Douw's "oscillator" effectively changed its moment critically (like a metronome), and thus the time-standard of his escapement, independently of train; not in a conventional way, but acting like bias in a spring-remontoir and, then, theoretically incalculable. It points to Douw's knowledge of Burgi's work, adapted to his single vertical oscillator. Here I suggest that Douw's admirable construction was in fact a *cross-beat* with a *spring-remontoir*, **I believe that has never previously been recognised as such!**

I do not pretend that Douw's "extended pendulum" gained favour, nor had any actual *terrestrial* advantages over Huygens' pendulums. But I return to Huygens' apparent ignorance of Burgi's constructions, so nearly common with Douw's. What better way to rebut Douw's counter claim, if not a pendulum, nor Douw's own? Similarly, if Douw's maintaining power was actually a remontoir, Huygens singularly failed to recall Burgi's - if he had then been aware of it!

Whatever the lack of merit in that Dutch litigation, Huygens' achievements cannot be diminished, despite prior claims for Kloss and Galileo. His contribution was not merely in affixing the free pendulum to a clock, with his crutch, but also empirical and theoretical proofs: ie. a pendulum not truly isochronous, due to circular error; and its correction by means of his "cycloid" cheeks; also endless rope rewinding system, and weight 'maintaining power'. It is in that spirit I offer my discovery and hypotheses, ie. not to diminish Huygens but to show others could have pre-empted him, but had not his success!

**Addendum (1-3-96):** Willem Hana, the noted Dutch horologist, obtained for me a copy of Douw's Octroi of 9 Aug.1658, and transcription by G.Doorman. Testing my Dutch to its limit I found that Douw had actually claimed, "*invention of a system to give an equalising force not affected by irregularities in train or weights that is present in Mr Huygens' invention (pendulum) made by Coster as licensee; and which also rewinds without upset*". So Douw's patent was neither a pendulum nor maintaining power, but a spring-remontoir driving an critical escapement that did all that he claimed to himself, sans Burgi.

Upon further considering this history I now infer Douw, being from the port of Rotterdam, had sought a practical Maritime Longitude Finder, and he was closer to it than Huygens ever was, but was denied the fruits of his invention by his untimely death on September 9th, 1663. He did not claim this application in evidence, he wisely held his counsel, but then he had no need to enlighten Huygens - who prosecuted him on false grounds. I have not

heard this expressed before. Perhaps some new search of The Hague's archives might locate these missing case papers, and reveal new evidence, to resolve Douw's construction and his possible underlying maritime expectations. But Douw's *true* criticisms, expressed in his patent, no less than Douw's demonstrations before the Dutch Court's several experts, including Huygens' own, may well have stung Huygens' pride, knowing Douw was right. Was this then why Huygens later went on to develop his 'new' weight-remontoir (1662-4), for his fundamentally misconceived *pendulum* marine clock with *weights*. Hooke understood its inherent defects and he could barely contain his '*schadenfreude*'. As to marine applications, was Hooke's "double-pendulum sea clock" (note same vague use of 'pendulum' nomenclature as used in the Dutch trial) inspired by Douw's earlier ideas? And how did Hooke's remarkably prescient 'double-foliot fusee sea clock' ever perform? © RKP

#### **NEW PERSPECTIVES:**

The quoted extract of my thesis stakes out my ground. However, in any *open research* it will be for others to form their own views based on the primary sources, the transcripts, also on their more authoritative translations of these revealing documents. Finding any clock by Simon Douw would ice the cake.

Even after reviewing Oosterwijck's Royal Haagseklok, which belongs to this same period of invention, intrigue and litigation, I still can find no reason to revise my thesis' understanding of Simon Douw's insights and constructions, nor his right acquittal of plagiarism, with due compensation and agreed rights at the Court of the Netherlands in December 1658. What I do not understand is, following his victory in the Courts, why did Douw never publish his new "*Longitude*" timekeeper in concept, or seek prizes, or produce in numbers?

Modern horologists presume the transition from all earlier systems to the new pendulum, which Huygens greatly advanced, was rapid or instantaneous. To some, the very idea of Douw scoring points against Huygens is puzzling and contrary to good sense. They argue there was but one pendulum inventor.

But even in the mid 17th Century superb clockmakers like Nicolaes Radeloff, Georg Meyer, Ahasuerus Fromanteel, and others, still maintained Jost Burgi's remarkable cross-beats and remontoirs to great effect. Dr Hans von Bertele (Op.Cit.) claimed astounding results for Burgi, around 30 seconds a day. Perhaps he over-egged the pudding, it was not matched by Dr Wolfram Block using Dr Bertele's own Radeloff dated to 1654-1660. (Block, Dr W., "*The Radeloff Cross Beat Clock of 1660*", *Antiquarian Horology*, Sep.1972, pp.700-703). Alan Lloyd dates Van Bertele's Radeloff to 1654. Incidentally, Block also discovered that Von Bertele's Radeloff required two balls at one time in the spiral drive to give *correct* constant power, ie. a manually loaded *remontoir*. (For other discussions of the drive and cross-beat in this clock see Bonham's catalogue, "*The Nicholas Radeloff Rolling Ball Clock*", 4-11-1998; also H Alan Lloyd, "*Some Outstanding Clocks Over Seven Hundred Years 1250-1950*", pp.97-98, Plates 109-111, Hill London 1958.).

Some authorities even predicted that a pendulum "*had to be*" in Fromanteel's great Zodiac-Musical clock (described by John Evelyn in 1660 and 1661), but actually made in 1649; even purporting that no "*pre-pendulum*" system could maintain the sort of accuracy required to maintain the clock's daily transits of its *mechanical-Sun* to keep pace with the *natural-Sun*, or ridicule would surely follow. Douw disproves such rose-tinted hindsight; in 1658 actually he was much closer to a *Longitude* clock than the great pendulum inventor himself. He died on 9 Sept.1663, before his inventions bore fruits. [Harrison's success was with a *spring-remontoir* and advanced *cross-beat*]

**Douw's** single, vertical, rotating-oscillator was not a "*pendulum*", as Coster and Huygens claimed. His was based on a late Burgi system, given "**BX3Rv**" in my classification of cross-beats, ie. **B**urgi, **X**-beat, **3**rd type, **R**adial escape-teeth, **V**ertical foliots, **v** for single, [nb. Burgi's Crystal Clock, has twin and also opposed balances; '*Unruhen*' in old German, therefore my "**BX4RU**".]

**Douw's "remontoir"**, (not "*a new maintaining power*" as was described by professional witnesses at Court), although fitted into a weight clock was probably spring-operated - because one cannot multiply loads on remontoir weights. But it is not known whether his remontoir drove his *escape-wheel*, or some lower wheel (for longer duration), nor how frequently, nor how it was rewound. Therefore it cannot yet be given an exact classification; among the known early weight or spring remontoirs by Jost Burgi, Johan Suyler, also Ahasuerus' Fromanteel ~ [From which the latter evolved, ie. "*invented*", his inspired variant, '**bolt and shutter maintaining power**' (B&SMP), being in principle, nothing less than a *manually-cocked spring-remontoir*].

Significantly, Burgi's *baton* was carried to northern Europe by his brother-in-law workmaster, Benjamin Bramer, who returned to Zwolle around 1617. In 1618, at Marburg, Bramer first published Burgi's mathematical instruments, ("*Bericht und Gebrauch eines PROPORTIONAL-LINEALS*", then, "*Berichts uber M.Jobsten Burgi GEOMETRISCHEN Triangular Instrument*").



Benjamin Bramer ~ 1616 (28 years)

The short step from Burgi's single-beam vertical-foliot which Douw used, to the pivoted- pendulum which Fromanteel used, was also demonstrated by the Campani brothers in 1658. Although just post-dating Huygens, they too had independently arrived at Fromanteel's flawed *pivoted-pendulum*, as Galileo Gallilei had before them all in 1635 and again in 1642. (Giuseppe Campani, "*Discorso*", 1660, pp.LVIII-LX, edited by Silvio Bedini). So why could not Fromanteel have followed that same course, rather than, now purportedly, *inventing* a retrograde pendulum several years after using Huygens' system?

Not for six more years would Huygens put his flawed *weight-remontoir* forwards for Patent, in November 1664, when he describes a *pendulum clock*, ("*een slingerende loot in plaets van onrust*"), one improved -*unspecifically*- by his long search for time-keeping perfection to resolve Longitude on board a ship, [<OC1278>](#). Even so, he was chided by Moray that the remontoir was Fromanteel's invention, (in Dudley Palmer's 1649 clock), then still in the King's Closet of Rarities. Huygens' reply was typically disingenuous, he cited differences in their remontoirs' motive-power, also periods of rewinding, without a mention of his *bete noir* Simon Douw's remontoir, nor Jost Burgi's. [Huygens had been equally cavalier with Bruce, diminishing his contribution to Huygens' Patent Longitude Clock, for the "extended *double-fork* crutch of inverted 'F' form"\*. Much later, in '*Horologium Oscillatorium*' he only gave anonymous credit to "A Scottish gentleman and a friend of ours", [\(\\*Note\)](#).

It is interesting to read Huygens' description of his remontoir, as recorded in the Court's *Octrooi*, December 5th, 1664, <[OC1279](#)>. His Patent describes the little weight driving the "*schaeckelradt*" (escape-wheel), being rewound by the larger weight. Probably, like Coster and Douw before him, Huygens would have delivered a working drawing and a model of his Remontoir to the deputised examiner of Patents. His first sketch, Aug-Sep., 1662, ([at Leiden](#)), and Commander Rupert Gould's diagram for "The Evolution of Clockwork", (J.D. Robertson, *Op. Cit.* Fig. 25, and pp. 154-156), depict the complexities of Huygens' flawed weight-remontoir. ([Appendix Three](#)). But even Gould's explanation of its working barely makes it comprehensible. Even Thuret had difficulty in making it reliable, he improved its little chains. *Appendix Five* in preparation deals with Alexander Bruce's English and Dutch Longitude Timekeepers - examined and described by this author.

Whereas, Douw's patent application does not mention Longitude, and Huygens' application does repeatedly, their explanations and their phrasing are each distinguished by a separation of their escapements' drives from their main power sources. But be assured, each inventor describes a *discontinuity* of driving force at his escapement, therefore being, in each case, a *remontoir*, but each working on very different principles. Knowing Douw's "*invention*" is not the same thing as knowing Douw's *mind*. But he worked in a city port, he must have known Gemma's 1530 dictum of a Longitude timekeeper, it was universally known, so I for one champion Simon Douw's *unstated* intent to eventually bring his system to fruition as a longitude timekeeper. He had no need, in the Courts nor in newspapers, to enlighten Coster and Huygens of a long term marine application of his spring remontoir and vertical oscillator.

Finally, given Galileo Galilei's publication of "*Discorsi*" in 1638, printed by Elsevier at Amsterdam, the still to be resolved historical conundrums are;

1. **After 1658**, did Simon Douw revert to Huygens' pendulum, or did he continue to develop his remontoir-cross beat for maritime use as Longitude timekeeper, or was his Patent subsequently voided?
2. **Before 1657**, in England, did Ahasuerus Fromanteel intuitively or accidentally pre-empt the Campanis, and even Christiaan Huygens, to find the direct route from his own vertical-foliot cross-beat (in Dudley Palmer's solar clock), to his own pivoted-pendulum, either on Burgi's radial saw-wheel or far older verge-wheel Huygens used?
3. If Fromanteel did not pre-empt Huygens, and if he did rely on Coster's 1657 patented pendulum, from John's time with Coster, as most historians and antiquarian horologists hold, why did he, *subsequently*, as those same historians and antiquarian horologists also hold, forsake Huygens' much superior way for his own flawed pivoted-pendulum with a direct spring drive, the worst case for isochronism? It does not tally with Fromanteel's known empiric nature, testing and developing new devices or techniques to resolve new mechanical problems, as I have described previously. The more probable answer is, he already knew the shortcomings of his own pendulum *when* Coster-Huygens' pendulums first appeared.

**Through 'open research', let Mr Simon Douw declare himself.**

© Keith Piggott

**Endnote:** Professor Mahoney's, "*Christiaan Huygens: The Measurement of Time and of Longitude at Sea*", is most informative, especially about Huygens' mathematical insights. Mahoney's [Note 5](#) cites John Leopold's odd assertion, "*Douw lost his case before the States of Holland*", (J.H. Leopold, *Studies on Christiaan Huygens, Huygens and his instrument makers*, pp. 234-270, editors H.J.M. Bos, et al, Lisse, 1980). Whereas, it is abundantly clear that Douw not only successfully defended Coster-Huygens' false claims, but that he won all that he sought, and more - also a third of their joint profits on their pendulums. His timekeeper also promised a maritime application.

~~~~~RKP~~~~~

#### Appendix Four, Annex 1: (11/4/10).

I thank Ms Rebecca Pohancenik, who is conducting research at the Royal Society, who brought to my attention a citation in Oldenburg's papers, in which Douw's clock is described in words which parallel the transcriptions of his patent document dated August 9th, 1658.

Emigré Polish intellectual, then English scientific reformer, Samuel Hartlieb/Hartlib (Elblag 1600-1662 London), on 7 March 1659, wrote; *"A certain Simon Davids (sic), a licensed watchmaker of the city of Rotterdam, residing in Wagen Street, has a new invention for a clock movement. The motion and strike are actuated by weights. Although no winding is required, they never stop\*. It would be extremely hard to discover any defect or malfunctioning which could be ascribed either to the wheels, wind and weather, or to a change of the weights. Even if one were to add 10,20,30,40,50, or 60 pounds of weight, more or less –according to the proportion of the clock–it would not run faster.† These clocks overcome all extraneous circumstances, yet require less effort and cost for maintenance. Their exact division of time is so superior to other types of clocks that, over a period of several months, they will not differ by as much as a minute, one from another¶*, (Royal Society Philosophical Transactions 1665-1677, MS MM/1, f42; trans. *"The Correspondence of Henry Oldenburg"*, 13 volumes, editors A R Hall & M Boas Hall, Madison, Wisconsin, 1965-1986, Part II, p.204).

**KP** \* Douw never claimed this but at limit of weight-travel the escapement would run for some time ~ being maintained by his *'spring-remontoir'*, formerly mistaken as *maintaining-power*. † Addition of weights to the going had no bearing on escapement force (remontoir): ¶ Infers Douw presented or tested two clocks. Hartlib's letter is significant because;

- *Hartlib belonged to the, so called, 'secret college', whose members were to found The Royal Society in 1661;*
- *Hartlib was well informed about latest European advances;*
- *Hartlib writes seven months after Douw's Patent, but only three months after the December 1658 consent judgement;*
- *Hartlib does not repeat Coster-Huygens' libels of Douw;*
- *Hartlib fairly presents Douw's horological achievement;*
- *Hartlib's claims for Douw's invention could not be matched by any pendulum system then available - or indeed if ever.*

Hartlib's informant had cited Douw's address, not given in his Octrooi, but mistook his name, so probably he was not one of five clockmaker witnesses called by Douw, but rather another Hartlib correspondent who had misread the written name in the actual Octrooi manuscript, which appears as,



ie. "Sijmon Dowo", being misread as "Simon Davids".

One now must wonder why the English horological establishment, then, did not lionize Douw, as they did Huygens; also, why did not Robert Hooke, and Alexander Bruce in particular, take-up Douw's remarkable devices - for a practical maritime longitude timekeeper, without the pendulum, (or the later flawed weight remontoir). Was the *pendulum* then, in March 1659, already so ingrained into the collective English consciousness? That hardly tallies with a purported unawareness of pendulums in England, allegedly only beginning with Ahasuerus Fromanteel's advertisements of his pendulums late in 1658. It is perhaps yet another clue that some form of *Galilei's pendulum* had had a longer history in England than thought hitherto. Might Thomas Grignon's claim, for Richard Harris converting a church clock to pendulum in 1642, be more than apocryphal? (see T.Reid, Op.Cit, p.17; see J.D.Roberton, Op.Cit. p.119). Whatever the reason, it seems no one in England then was willing to abandon the seductive promise of Gallilei, reiterated by Christiaan Huygens, that the pendulum was a panacea of timekeeping, on land or even on the sea. Yet nothing was further from the truth, as Robert Hooke had quickly realised.

~~~~~RKP~~~~~

Appendix Four, Annex 2: (9/7/10).

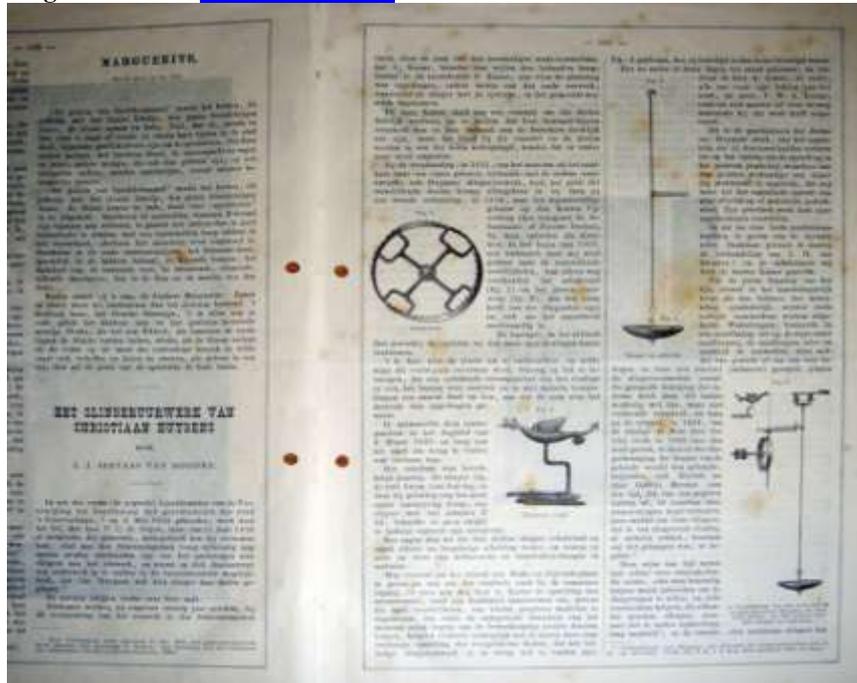
**"HET SLINGER URWERK VAN CHRISTIAAN HUYGENS"**  
(The Pendulum Clockwork of Christiaan Huygens)

by A.J.Servaas van Rooijen

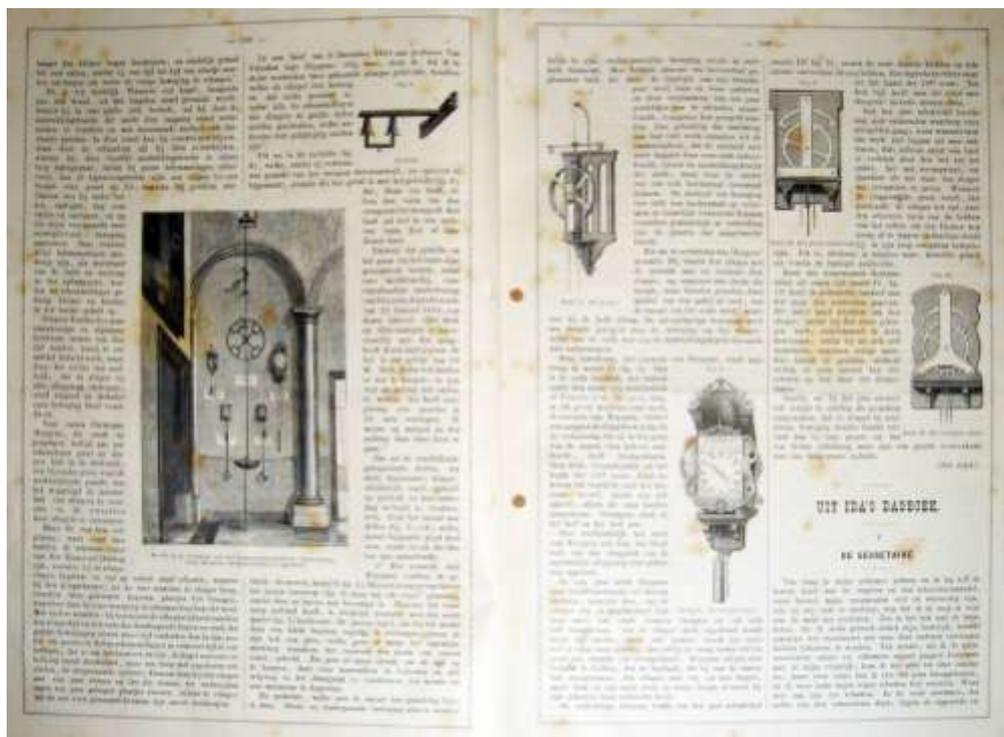
Extracted from "*EIGEN HAARD*" (1899) by courtesy of Michiel van Hees.

As with the manuscript of Simon Douw's 'Octrooi' (Patent) reproduced above by permission of Netherlands' National Archive, here I reproduce facsimiles of a short article in *Eigen Haard* (Own Hearth) in 1899, by A.J.Servaas van Rooijen, Director of The Hague Museum which displayed a 1658 pendulum. [I also refer readers to Reith's article (*Tijdschrift* #1), quoting Eigen Haard].

Page 106-107. <Ap4 Rooijen1>



Page 108-109. <Ap4 Rooijen2>





Servaas van Rooijen's title casts Christiaan Huygens as the eponymous hero, Salomon Coster as his deputised clockmaker, and Simon Douw as villainous plagiarist; who in July-August 1657 had visited Huygens to learn all about the new pendulum, (see page 1 above, <OC532>); then, on 15 April 1658, inveigled himself into Scheveningen clock-tower, to examine the pendulum conversion of its tower-clock by Huygens and Coster, despite their ban on Douw. Huygens was incensed; on 20 May 1658 he sought an *Akte* (Deed) by Notaris Hermanus de Coninck, at The Hague, taking school-master Adriaen Louriszoon as his witness (*by hearsay*), to Douw's offer of a silver Ducat to his housemaid (*huysvrouw*) to gain access to the pendulum clock. The water damaged Notarial *Akte* was preserved, but parts were unreadable. I suggest, it tells us as much of Huygens' character, as of Douw's intrigues. Is this 1658 *Akte* still preserved or has it, like the *1658 Court Papers*, also been lost?

Much of the article concerns itself with the long evolution of timekeepers, quoting J.H.van Swinden, showing several variants, and stating Galileo first disclosed the properties of the pendulum to all of Europe's scientists, when Huygens applied Galileo's pendulum to clock-work in 1656. He mentions Riccioli, Hevelius, Mouton and Graham. Interesting, but known. He cites personal history between Huygens and Douw, but little credit to Douw.

More usefully, Servaas van Rooijen illustrates several elements of the tower-clock had that found their way into the museum collection in 1869; then were lost; then partly reconstructed by Kaiser circa 1887. Their scale is impressive; Coster's original escape-wheel (*Schakelrad*) having *four* bi-furcated spokes; the verge (*Lepelspil*); the vertical verge's original suspension in the form of a flying dragon, he called '*vogel*', (bird); the original pendulum (*Slinger*), with replaced boat-shaped bob; and original *double-cycloid* suspension (*Cycloïde*). It has to be said, despite the many claims to the contrary by Huygens also by Coster in correspondence and in an open court, none of these salient features had formed any part of Douw's invention as described in his Patent, nor were cited by witnesses, nor were cited by the Learned Judges at the *Court of the States General* in 1658, when Douw *won* outright! [not lost, [see N5 Leopold](#)]

Given the awe in which Huygens was and is still held, the gist of Servaas van Rooijen's article is unremarkable. He found no Douw *invention*, yet allowed him some credit. I invite Dutch linguists to bring his article to wider English-speaking audiences, by submitting translations to attach to Appendix Four. Until an English transcript is attached, I leave readers to translate for themselves, but I re-assert it makes not one *iota* of difference to my thesis.

~~~~~RKP~~~~~

## Appendix Four, Annex 3: (25/7/10).

### "EEN ROTTERDAMSCH MEDEDINGER VAN CHRISTIAAN HUYGENS" (Rotterdam's Competitor to Christiaan Huygens) by J.J.MOERMAN

*Extract from 'Nieuwe Rotterdamsche Courant', 29 Nov.1929*  
(Translated by Keith Piggott)

At page 2 above, I said that Dutch author J.J.Moerman fairly stated Douw's prominence, being "*Rotterdam's Competitor to Christiaan Huygens*", in his serialised article for the [Nieuwe Rotterdamsche Courant](#), in November 1929. Moerman was a popular writer of "Dutch Histories" published during the 1930s-1940s, now collectable in their own right. His article was serialised in Rotterdam's own evening newspaper, the editor "EW" adds pertinent foot-notes and remarks on Dutch practices which I mostly translate to inform.

While Moerman's article does not examine Simon Douw's actual Patent, nor arrive at any conclusions about the true nature of his "invention", it does demonstrate Douw's craft status and his prominence prior to the Huygens-Coster action for plagiarism and infringing their Patent. He also shows Douw in a more favourable light, having something even Huygens and Coster had to accept as an independent timekeeper that they could not obstruct sale of, even in their own province. Therefore, I decided to make a translation, to add to the corpus of former opinions on Douw. The Dutch text may be had from the link above. Page numbers allow readers to more easily locate passages in the Dutch text. Defects in translation are mine. Footnotes are copied verbatim where necessary to understanding, (otherwise set in parentheses or omitted).

In 1656, the already famous Christiaan Huygens invented the pendulum clock. Huygens assigned the right to make and exploit his invention, in pendulum clocks, to the Hague clockmaker Salomon Coster who in the following year obtained a Patent from the States-General. Sometime later the States-General granted a similar Patent to the city-clockmaker of Rotterdam, Simon Douw. Douw declared to have invented a clock that differed from all previously used, especially that of Huygens. According to Coster, Douw had copied Huygens with only one small difference. He did not hesitate to proceed against his Rotterdam competitor, before the Supreme Court of Holland.

From the start, Christiaan Huygens was incensed by Douw's infringement, apparent in his letters' comments. In one letter to his former tutor, famous Leiden mathematician professor Van Schooten, he named Douw "*a shameless man, who by devious ways had copied his work*". In a letter to Van Schooten he dubbed Douw's dealings as "*sinister methods of this plagiarist*". Professor Van Schooten also judged that Douw '*had not been independent*'. When the scholar was able to scrutinise both clocks, he gave Huygens written advice as to "*providing clear and convincing proof that that which Simon Douw's invention purported was derived from Huygens' invention*".

From a letter by Huygens to his nephew Mr.Willem Piek, we also understand that Douw had offered to work together under Coster's patent. According to Huygens, when this was denied him, Douw had by lies and menaces obtained knowledge, which also gained him a Patent [*Octrooi*] from the States-General. [\[p.47/p.48\]](#)

The judgement of those clockmakers asked to provide evidence was very different. According to Notarial Deposition of 9th October 1658, before Notary Valette of The Hague, by Rotterdam clockmakers Benjamin Lisle and Johannes van der Thoorn. They declared they had carefully investigate the construction and operation of both clocks, and concluded that Douw's clock was very different to Huygens. In their judgement, Douw's clock should be seen as a most extra-ordinary invention, which to their knowledge was formerly unknown. Should they be asked to choose, then their townsman's invention [*Douw's*] was preferred to that of Huygens. Finally, and if required, they declared their willingness to confirm their testimony under oath.

Likewise, by Notarial Depositions the Roussel brothers, clockmakers of The Hague, fully shared the opinions of their Rotterdam colleagues. At a hearing on 9th October [1658] by order of The Hague's Supreme Court of Holland, before Justices Mr Hugo Blocq and Mr Pieter Ockerszoon, expert witnesses examined the clocks of Huygens and Douw.

Present at Huygens' request, was professor Van Schooten as independent mathematician. Here again, the evidence of the clockmakers favoured Douw. As emphasis, a certain '*master in the free arts*' D.Nieuwenhove of The Hague also declared knowledge gained of both inventions and was fully in accord with the clockmakers. [\[p.48/p.49\]](#)

This assessment, where Douw's craft members acknowledged his device as original, cast some doubts as to his guilt as alleged. One obstacle to Douw, among evidence in the action, was a Witness Deposition by the Sexton-schoolmaster Adriaen Louriszoon of Scheveningen

At the end of Scheveningen's Keizerstraat is the tower that had first received Huygens' pendulum conversion. Huygens had secured its key with the said Sexton, charging him not to allow access to anyone without written permission by himself or Coster. Sexton Adriaen Louriszoon had sworn a Deposition on 20 May 1658, before Hague Notary Harmanus de Coninck, declaring;

*"on 15th April that year, a certain Simon Douw, clockmaker of Rotterdam, came to his house and had sought access to the tower from Louriszoon's house-wife. The Sexton's wife had granted that request, allowing Douw to see the inner workings. To Douw's request to inspect the "other work" the wife replied that she was not able to. Douw returned the next day, and repeated his request. Moreover he offered the wife a silver Ducat which he set on the counter. But Louriszoon's wife refused it, saying that Douw might not enter without written proof from Mr Huygens or Salomon Coster."* [KP. *Wife?* All other transcripts give '*house-wife*' or '*house-keeper*'; and all this is Hearsay].

What happened next is unclear, the Deposition is so water damaged that the writing has washed away. From the legible words it would appear that Douw, nevertheless, again visited the tower and had viewed the clock mechanism. According to the Scheveningen Sexton's Deposition, Douw so much desired to learn from Huygens' clock that he could not desist from attempted bribery.

[\[p.49/p.50\]](#)

On 8th December 1658 the Supreme Court of Holland gave a Judgement in the Coster-Douw action. Given all that had preceded, the terms, whereby the parties had reached a Settlement through the High Court's mediation, are somewhat surprising.

Huygens and Coster emphatically maintained their assertion that Douw had copied Huygens' idea; They no longer opposed Douw's grant of a License he already held from the States-General; Whenever Douw obtained an "*attache*" (Permit)<sup>1</sup>, then the profits so received from clocks by Douw also by Coster should be divided equally between Huygens, Coster and Douw. Should any other party damage the litigants, either by seeking a Patent on pretext of a new invention, or copying their clocks, then each according to his judgement could issue proceedings having robust mutual support<sup>2</sup>.

The above article was serialised in *Nieuwe Rotterdamsche Courant*, Evening edition, 29 April 1929. By generous permission of the author I

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<sup>1</sup> Whenever anyone obtained a Patent for invention from the States-General, in order to put the invention into practice in any Province, required a special consent by that Provincial Government, to have an "*attache*" [Licence].

<sup>2</sup> See OC de CH, General Correspondence 1821, vol.II, p.132. Stated in the last mentioned work, according to minutes of the community of Utrecht, in the same year 1658 when the Scheveningen church tower got its pendulum clock, Douw already installed pendulum clocks in public buildings (except the Dom, where Coster's instrument was). Informal investigations by Utrecht's archivist found no evidence, although searches in the accounts of the Geertekerk [church] only show that Douw delivered "*a clock*" to the church in 1658. (Geertekerk Accounts 1658, Fol.II, and 1659 Fol.12 and 13). [\[p.50/p.51\]](#)

reproduced it here, using the opportunity to outline the contribution made by Douw to Rotterdam life and activity, who supposedly was of Scottish origin, now somewhat better informed". [KP. An editor's note. Two subsequent pages provide an invaluable biography of Douw]

"Simon Stoffelszoon Douw born at Delft circa 1620, later moved to Rotterdam and registered on 6 August 1645, lived on the Steiger with Hester Ackermans a young woman from Leiden. Their marriage was at Leijden, on 27 August 1645. A son, Christoffel, was baptised as a protestant at Rotterdam, 20 August 1648. The couple made mutual Wills at Notary Balthazar de Gruyter, on 20 January 1651.

Simon Douw, "*master horologe maker*" bought a house on the westside of the Westwagenstraat on 9 November 1656. He died on 9 September 1663 and was buried in the French church. His widow, who meanwhile remarried to the brass founder Dirk Groothuys, sold the house on 1 May 1664.

Already by 1651, Douw was paid the sum of 250 Guilders "*for repairs to the city's clocks*". Thus he was already the City Clockmaker, and as such successor to Isaak Joriszoon whose widow was granted a pension in 1652. (see *City Accounts 1651 fol.307, and 1652 fol.204; also see 1652 fol.207 and 1653 fol.281*). Several payments to Douw are justified in these City Accounts.

Besides manufacturing the mechanism in the Oppert (at St.Severus-kapel?), in 1652 he contracted to construct "*a competent clock*" on the Delfschepoort, "*having a hand on each aspect [face], also a fair-sized bell with striking*". (Burgomasters Resolutions, 11 Jan and 30 May 1652).

The English church, on the north side of the Haringvliet, also had Douw to thank for its clock. In November 1651 he contracted with Burgomasters and manufacturers to deliver a clock to this church and he was paid 395 Guilders in that same year. (City Accounts 1651 fol.364).

However, all these dateable clocks were before the discovery by Christiaan Huygens. Nevertheless, in 1661, he again received an order from the Burgomasters to install new musical work in the towers of the Stadthuis and the Grootkerk. [\[p.51/p.52\]](#)

This naturally relates to the great carillons which, in the previous year (1660), Frans Hemony the famous bell-founder had constructed for the Stadthuis and St.Laurens towers. To Douw, as City Clockmaker, came the order to bring the hammers and iron wirework into playing order for acceptance. And here it appears he first applied the lately invented pendulum to clockwork.

*Is Simon Douw*", cites the next resolution by Burgomasters on 24 June 1662, "*herein stated and also repeated conditions of afore-mentioned Burgomasters, concerning the tone of the afore said carillon [glockenspiel], in case it were eventually to prove itself not well made or not reliable for the purpose it was made, in such case he shall not seek or demand one penny costs from the city for his art and labour involved, also submitting himself freely to the judgement concerning the quality of the aforesaid tone to Jan van Kall, at the moment staying in Delft*". [KP. Thanks to Hans van den Ende for this tortuous passage]

One sees that new concerns had arisen, where the Burgomasters were hesitant about possible liabilities which, in so far as possible, they wished to protect the city and also themselves from. Therefore they stipulated that the carillons be approved by Jan van Call or Kalle of Nijmegen, who had designed and made them. (Provisional List, Netherlands' Historical & Artistic Monuments, p.29).

That the City Council concluded their full satisfaction at Douw's work is evidenced by payments from the City Accounts for 1661, 1662 and 1663, whereby he was paid no less than 5100 Guilders over a two year period, beginning with the entry for 6 July 1661, stating as follows:

*"Paid to Simon Douw clock-maker ten hundred Guilders to account for his services to the carillons of the Stadthuis and Great towers"*, and ending with an entry on 18 April 1663, also of 1000 Guilders, with one final entry on

According to Van Reyn, the total costs of the carillons' installations amounted to 13,000 Guilders\*. The work played for the first time in 1662, thus during Douw's lifetime. (\*Historical Description of Rotterdam, 1263. Douw is wrongly named *Fr. van Douw*).

It is in no sense impossible, that Douw had arrived at the pendulum clock simultaneously or even before Huygens. By the conciliatory way, in which, finally, he was dealt with by Huygens, we may well remark that he asserted certain rights. Moerman did well to draw attention to this capable Rotterdam clockmaker, who died so soon after his invention'. EW.

#### A DELIGHTFUL CARILLON

*"Should anyone wish to be informed about the carillon playing, they should contact the Sexton at the 'Quartier', Quod Factum".* (Resolution of the City Reformed Church Council, 19 Oct.1665).

END

**KP.** I agree with the editor EW, or Moerman. Hypothetically, *"it is no sense impossible that Douw had arrived at the pendulum clock simultaneously or even before Huygens"*. Others had done so, and Ahasuerus Fromanteel has been among the names I have advanced. But in Douw's particular case, that hypothesis does not fit the evidence of cited documents published in 1658/9.

The suggestion that, in 1658, Douw delivered "pendulum-clocks" to public buildings in Utrecht (see footnote 2), is not evident in Geertekerk accounts. Yet it is not unlikely, at some time, after the Parties' High Court Settlement in December 1658, that Simon Douw might have converted and fitted Huygens' pendulum retrospectively to several important tower clocks, as J.J.Moerman infers happened in 1662. It even is possible that Douw also fitted a pendulum to some domestic clocks, too. But that is not to say his own patent of 9th August 1658 had in fact incorporated any form of pendulum.

Moerman cites Rotterdams' great carillons, naming both Frans Hemony, the famous Dutch bell founder, also Jan van Call the *"capable and honest"* (Huygens' description) Nijmegen clockmaker who in 1657 received Huygens' *"privilege"* to use his pendulum invention, as being responsible for the two great carillons; cast in 1660, erected in 1661, then subject of Burgomasters' 'risk-averse' post-event resolutions in 1662, which Simon Douw, evidently, had accepted and had ably performed to their fullest satisfaction, getting both Jan van Call's approval of their music, also the City's payments of 5100 Guilders in total, the last 600 Guilders to Douw's widow in February 1664. If either of Rotterdam's great tower clocks had then (1662) had a pendulum fitted, could it possibly have been part of Van Call's contributions to those projects - and perhaps not Simon Douw's as Moerman or his editor infers?

However, without quoting Douw's Patent, and apparently without technical expertise, also based only on the scant received wisdom till then obtained only from Huygens correspondence and his joint action with Coster against Douw, J.J.Moerman puts a different and new complexion on the story and character of Simon Douw. Nevertheless, on the evidence and facts as I have presented them herein, I do maintain my position on Douw's independent invention/s of a spring-remontoir and single-arm foliot probable cross-beat like Jost Burgi's, very likely through the intermediary of Benjamin Bramer who returned to Holland after working with Burgi in Prague.

~~~~~RKP~~~~~

**"DE SLINGER ALS TIJDMETER"  
(The Pendulum as Time-Measurer)  
by R.D.DOBSON**

A Dutch correspondent, who received my draft of Appendix Four, drew my attention to Richard Dobson's fine monograph, *"De slinger als tijdmetr"*, (R.D.Dobson, Achterland Verslagscompagnie and Uitgeverij Fagus, 1999). He referred me to chapter 4.1, *Plagiaat* (Plagiarism), and to Dobson's other few citations of Douw's device. He pointed to Dobson's conclusions, being very different to my own. Our respect for Dobson's opinions is mutual, but his referral clearly amounted to a challenge founded on Richard's *'Plagiaat'*! Here, I would save other readers that difficulty, and time.

When Richard sent me his new book we corresponded on the very subject of Douw's *"plagiarism"* or *"invention"*, its construction, also its implications. To put my position, I sent my unpublished thesis, *"Emerging from the Shadows, the True Patriarch of English Clockmaking Ahasuerus Fromanteel the Elder (Norwich 1607-1693 London)"*, [pp.185]; pertinently Part V, (cited at pp.6-9 above); *"Jobst Burgi's Libramentum Duplice and Momentum Fidelis, also evidence of Ahasuerus Fromanteel's derivations in his Sunclock (1649), and Douw's (1658), in the late pre-pendulum era 1638-1658"*. RD reciprocated, giving me several of his own articles, then still and perhaps yet unpublished;

1. *"Het merkwaardige slot van Christiaan Huygens' Horologium (1658)"* - pp.7, [ie. *The Remarkable Conclusion of CH Horologium (1658)*], in which Richard developed ideas founded on p.47 of his book.

2. *"Een merkwaardige tegenstrijdigheid in het Horologium van Christiaan Huygens"*, pp.5, [ie. *A Remarkable Contradiction in the Horologium of CH*].

3. *"Salomon Coster en John Fromanteel - Een contract en een gentlemen's agreement"*, pp.5. [ie. *Salomon Coster and John Fromanteel - A Contract and a Gentlemen's Agreement*], of which he said, "3 will never be published in Holland, because it is not favourable to Huygens". [Did he publish any?]

**Apropos Richard Dobson's "De slinger als tijdmetr" (DSTM):**

Richard's chapter, *Plagiaat*, is much more a defence of Huygens as plagiarist of Galileo, rather than a considered view on Douw as plagiarist of Huygens. As to Mr Simon Douw, Richard merely quoted extracts from Court papers in *"Oeuvres Complete de Christiaan Huygens"*, Vol.II. Correspondence 1658, (OC de CH),

Like Servaas de Rooijen, J.J.Moerman, also Frank Reith, Richard Dobson did not discover the manuscript Patent, neither does he identify the *'kernel'* of Douw's invention, (NL. *'uitvinding'*), but he alone discloses the transcript of Douw's *"Octrooi"* (Patent) of 9 August 1658 <OC528> (Chapt.2.2. *Salomon Coster*, pp.29-30). Richard also copies five other transcripts, all from OC de CH, which I too have cited. All of which makes it harder to understand why Richard did not already, then, identify the real nature of Douw's invention, nor its possible applications, nor its real potential for a maritime Longitude time-keeper or "sea-clock". Nevertheless, before his final illness, we enjoyed an interesting technical and historical correspondence.

In that correspondence, Richard specifically addressed my questions about his own knowledge of Douw's *"invention"*. In a letter dated 23 July 1999;

- RD repeats lines from DSTM 4.1 p.62, and refers to arguments at pp.28-32. He makes clear that is all he knows, then concedes, *"So I think that what your opinion about Douw concerns, you are right"*.
- RD goes on to say *"I am now working on a new article to prove that Ahasuerus Fromanteel used the pendulum before Huygens did. This information is hidden in the Horologium of 1658"*. **KP. Nota Bene!**

~~~~~RKP~~~~~

"SNAPSHOTS ON DOUW, IN MODERN ACADEMIC PAPERS"

Search engines for '*Simon Douw*' produced surprises from no less than three modern scientific and horological sources. I hesitate to express opinions on bald assertions that do not cite supporting references, framed arguments, or contexts; but taking these three assertions at face value, I am indeed curious about their contexts, primarily because two seem to make eminent sense.

["Transferring Technical Knowledge and Innovating in Europe, c.1200-c.1800"](#), Stephan R.Epstein (LSE, Tokyo Seminar, 2006). "*In early 1658 a Rotterdam clock-maker, Simon Douw, circumvented Huygens' patent with such success that Huygens abandoned the attempt to enforce the patent in the Dutch Republic.*" (page 12). **KP.** '*circumvented*' misunderstands Douw's insights.

<http://www.scribd.com/doc/6909820/Tales-of-mathematicians-and-physicists>  
*"Tales of Mathematicians and Physicists"* was first published in Russia in 1981, being drawn from papers published between 1960-1980; enlarged in a third edition in 2001. An English edition was translated from the 3rd Russian edition by Alan Shuchat, Department of Mathematics, Wellesley College, Wellesley, MA 02181, USA, being edited by Simon Gindikin, Department of Mathematics, Rutgers University, Piscataway, NJ 08854, USA. (Springer Science+Business Media LLC, New York, NY 10013, USA). Actually, I found it readable and entertaining. It begins with "*Ars Magna*" (The Great Art [Knowledge]), up to "*The Complex World of Roger Penrose*".

The chapter on "*Christiaan Huygens and Pendulum Clocks*" deals with all aspects of his pendulums, including "*The Physical Pendulum*" (p.87), when Huygens first discovered the means to establish the centre of oscillation of a compound physical pendulum in 1660. [I highlighted his '*Cnoop*', secondary Cursor (or bob), in his sea-clock; also in '*Horologium Oscillatorium*', Fig.1]

Without placing myself in jeopardy of US copyrights, authors assert Douw's so called '*pendulum*' inspired Huygens' insights into *centres of oscillation*\*. Whilst their claim is unsupported, I do follow that intellectual connection, first framed in the learned Dutch judges' 1658 findings, when to their great surprise, its beat altered markedly whenever the upper *Cnoop* of Douw's oscillator was adjusted. Yet I am surprised that a modern Russian author has conjectured that this was the spark that set off a train of experiments by which Huygens quickly realised his solution, one of his most outstanding successes where great savants Mersenne, Decartes, Honoré Fabry failed. \*L.Deffosse first put this proposition in 1946, he also distinguished Douw's and Huygens' different systems, ("*Les Savants du XVII Siecle et la Mesure du Temps*", p.117).

<http://www.kirxklox.com/project/aess/article0001.html>

*"A Collection of Model Escapements"* by W.H.Samelius, Director of Elgin Watchmakers College, appeared in "*Hobbies - The Magazine for Collectors*" published in January 1938 and reprinted by Samuel Kirk in 2006. Samelius is succinct, "**Simon Douw, Rotterdam, patented the *slow motion pendulum* in 1658**". **KP.** The citation is unattributed and unsupported, *italics* are mine.

Again, I follow that intellectual association. Douw's small oscillating vertical foliot derives from Jost Burgi's constructions, which typically beat Seconds'. Viewing Douw's oscillator, it might well be termed a '*slow motion*' pendulum because a *true* pendulum having its dimensions oscillates three times faster. Only Huygens' longer true-pendulums of 1657, (also 1673), beat Seconds; or half-Seconds using 'OP' gearing, ("*Horologium*" 1658). Being very similar to Douw's escapement, Ahasuerus Fromanteel's vertical cross-beat construction of 1649, (Dudley Palmer's solar and musical clock), probably beat Seconds'; whereas his first *pivoted-pendulums* of circa four-inches, (still in Davis Mell's circa 1660 automaton-carillon clock), beats 180 times a minute. So Douw's similar length foliot would indeed appear to move in '*slow motion*'. By that single observation, if now verifiable, is utterly destroyed every possibility of Douw's 1658 Patent being for a "*pendulum*" ~ suspended or pivoted! **QED.**

I welcome notice of all papers relating to Simon Douw. Keith Piggott