ASN.1
Communication between Heterogeneous Systems

Olivier Dubuisson

translated from French by Philippe Fouquart

http://asn1.elibel.tm.fr/en/book/
http://www.oss.com/asn1/booksintro.html

June 5, 2000

ASN.1
Communication between heterogeneous systems

by Olivier Dubuisson

ASN.1 (Abstract Syntax Notation One) is an international standard which aims at specifying of data used in telecommunication protocols. It is a computing language that is both powerful and complex: it was designed for modeling efficiently communications between heterogeneous systems.

ASN.1 was in great need of a reference book, didactic as well as precise and Olivier Dubuisson's book meets these demands. The language is comprehensively described from its basic constructions to the latest additions to the notation. The description of each of these constructions is wholly accessible and accurate. Many case studies of real-world applications illustrate this presentation. The text also replaces the language in its historical background and describes the context in which it is used, both from the application viewpoint and from that of other specification standards which use or refer to ASN.1.

This book is written by an expert of ASN.1, of its syntax and semantics, and clearly constitutes a reference on the language. It is intended for those merely interested in finding a complete and reliable description of the language and for programmers or experts who may want to look up for the proper usage of some constructions. The tools available on the website associated with this book will prove useful to both the proficient and the beginner ASN.1 user.

Michel Mauny
Project leader at INRIA, the French National Institute for Research in Computer Science and Control

Olivier Dubuisson is a research engineer at France Télécom R&D, the Research & Development centre of France Télécom (formerly known as Cnet), where he is in charge of the ASN.1 expertise. He takes part in the language evolution at the ISO and ITU-T working groups. He has also developed various editing and analysis tools for ASN.1 specifications and assists the ASN.1 users at France Télécom in numerous application domains.

Philippe Fouquart graduated from Aston University, UK with an MSc in Computer Science and Applied Maths in 1997. He worked for Cnet on ASN.1:1994 grammar and later joined France Télécom R&D in 1999 where he used ASN.1 for Intelligent Network and SS7 protocols. He is now working on Fixed-Mobile Converged architectures and IP mobility.

Part I

Introduction and History of the Notation

Chapter 1

Prologue

"Mr. Watson, come here; I need you!"

Alexander G. Bell, 10 March 1876.

Melville Bell, teacher of elocution at the University of Edinburgh acquired a worldwide reputation not only as an expert on correct pronunciation but also as the inventor of 'Visible Speech' [Bel67], a written code[1] providing a universal alphabet — *some may say an abstract notation* —, describing the precise positions and the respective actions of the tongue, the throat and the lips while speaking (see Figure 1.1 on the following page). This code published in 1867 [Bel67] was initially meant to make foreign languages — *the abstract syntaxes* — pronunciation easier since it provided a way to link one language to another. It finally proved more useful for teaching diction to deaf people.

In 1862, 15-year-old Alexander Graham, Melville Bell's son[2], uttered strange sounds that his father had written in 'Visible Speech' while he was out of the room — *using the speech basic encoding rules, Alexander associated a transfer syntax with the abstract syntax his father specified.*

A year later, Alexander and his older brother Melly built a talking machine out of a fake skull of gutta-percha filled with cans, rubber, and a lamb's larynx to make up the vocal parts. They then blew through it, making it cry out "*Ma-Ma!*".

---

[1]The set of characters can be found at http://www.indigo.ie/egt/standards/csur/visible-speech.html.

[2]A short story of Graham Bell and some photos are available at: http://www.garfield.k12.ut.us/PHS/History/US/1877/inv/alex/default.html.
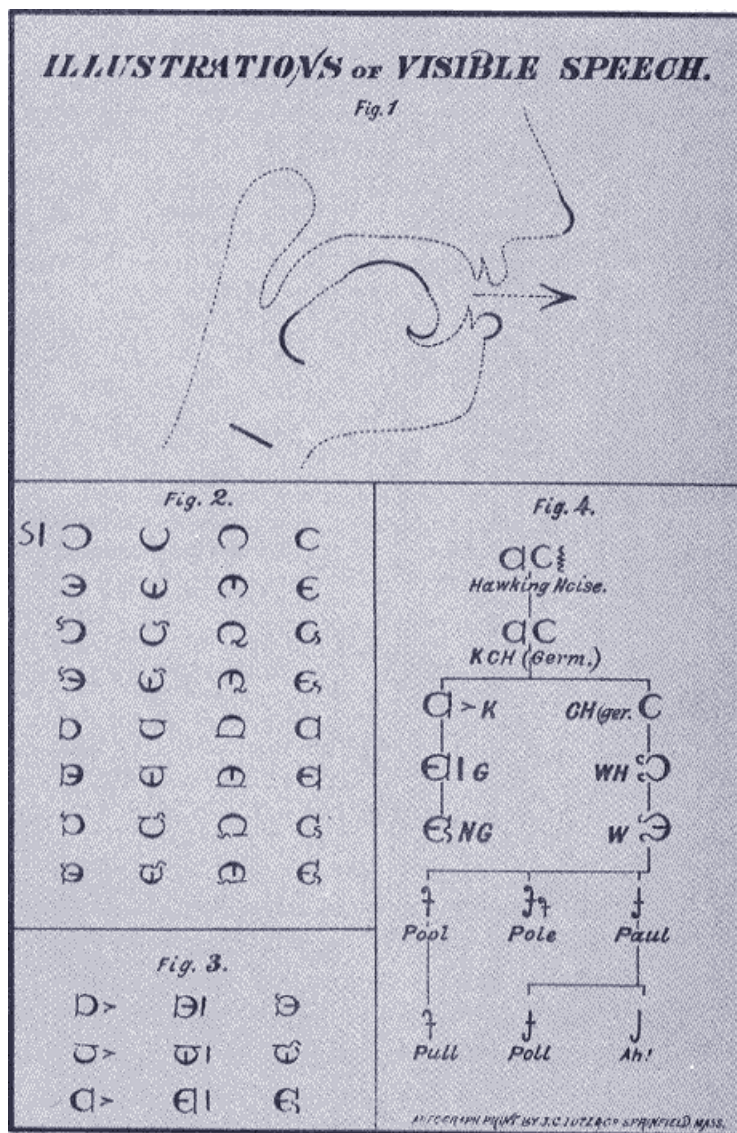
Figure 1.1: The three organs represented by 'Visible Speech': the lips (*Fig. 2*), the tongue (*Fig. 3*) and the throat (*Fig. 4*)

DOCKET ALARM

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts

Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research

With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips

Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.

fastcase®
Smarter legal research.