Page 2, line -4: replace "the projection map" by "the bilinear map defined by $(x, a) \to ax$".

Page 3, line 5: replace two occurrences of $\phi$ by $\psi$, as $\phi$ is already used.

Page 8, line 3: "Let $N_0$ be a direct factor of $N$ free of finite rank".

Page 9, Lemma 2.7 (Nakayama's lemma), Remark 2.8 and Corollary 2.9: replace the local ring $A$ by an arbitrary ring $A$, and the maximal ideal $\mathfrak{m}$ by the radical $I := \mathrm{Rad(A)}$ of $A$. This is needed for the proof of the new Proposition 7.1.32.

Page 10, lines 9-10: replace "ideals" by "prime ideals".

Page 10, line 17: replace "$n \geq 1$" by "$n \geq 0$" because we want the unit to belong to any multiplicative subset.

Page 16, line 4: replace "sum $V_1 + V_2$" by "difference $V_1 - V_2$".

Page 19, line 12: $F_j \in \underline{I}$.

Page 21, line -10: $N := x\underline{A}$.

Page 21, line -2: $0 \to N \to L \to M \underline{\to 0}$.

Page 22, line -10: $\alpha = \underline{a}(1 - \delta)$.

Page 24, line -5 : replace $\pi_n$ by $\pi_{n-1}$.

Page 25, line 1: Add 0 at the end of the exact sequence.

Page 28, end of the proof of Lemma 1.6(a): replace "Which is impossible" by "Which contradicts the hypothesis on $f$."

Page 29, line 16: the assumption "$A_0$ noetherian" is not necessary.

Page 29-31, Prop. 1.9 and Lemma 1.18: suppose that $A$ is non-zero.

Page 30, Prop. 1.11: suppose $I$ is a proper ideal.

Page 32, line -12: replace $A_p$ by $A_{\mathfrak{p}}$.

Page 33, line -2: replace $F(V)$ by $\mathcal{F}(V)$.

Page 35, line 1: replace "$\{U_i\}_i$" by "$\mathcal{U} = \{U_i\}_i$", and "We let" by "let".

Page 36, lines -14 and -13: $f(\underline{y}) = s_{\underline{y}}$ for every $\underline{y} \in V$.

Pges 41, lines 1-2: replace "these morphisms are isomorphisms" by "the first morphism is surjective". The original **statement is false**.

Page 41, line 5: the bijection is $\mathrm{Mor_Y}(\mathcal{G}, \mathrm{f}_*\mathcal{F}) \simeq \mathrm{Mor_X}(\mathrm{f}^{-1}\mathcal{G}, \mathcal{F})$.

Page 43, line 13: replace $V \subset U$ by $V \subseteq U$.

Page 43, line -11: replace "An open subset" by "A proper open subset".

Page 45, bottom line: replace $\varphi^{-1}(\mathfrak{p})$ by $\varphi^{-1}(\mathfrak{q})$.

Page 51, line -3: rephrase the statement to avoid Overfull.

Page 52, lines 6-7: The equality $V(I) \cap \mathrm{ProjB} = \mathrm{V}_+(\mathrm{I}^{\mathrm{h}})$ is **false**. Use instead the fact that $D(f) \cap \mathrm{ProjB} = \cup_{\mathrm{i}} \mathrm{D}_+(\mathrm{f}_{\mathrm{i}})$ if the $f_i$ are the homogeneous components of $f$. See the new text.

Page 54, line 7: Lemma 3.36 (a).

Page 56, line 10: replace "isolated point." by "isolated point in $X$ (i.e., $\{x\}$ is an open subset of $X$)."

Page 72, Lemma 2.5.16: Suppress the hypothesis that $A$ is local. The proof is modified.

Page 73, line -10: replace "degree $\geq 1$" by "degree 1".

Page 75, Exercise 5.2: add the statement "If $Z$ is a closed subset of $X$, then $\mathrm{codim}(\mathrm{Z}, \mathrm{X})$ is the minimum of $\dim \mathcal{O}_{X,z}$ for all $z \in Z$".

Page 75, line -4: replace "This is ..." by "One can suppose that $\mathfrak{p}_r$ does not contain any $\mathfrak{p}_i$, $i < r$."

Page 77, line -16: replace "discriminant" with "determinant".

Page 79, line -11: replace "Lemma 2.3.23" by "Proposition 2.3.25".

Page 82, line 3: replace $B[T_0, ...T_n]$ by $B[T_1, ...T_n]$.

Page 87, line -2: replace $f^{-1}(Y_i)$ by $f^{-1}(V_i)$.

Page 90, lines 1-5: replace "Let us show ... prime ideal" by "Let $\mathfrak{q}$ be a prime ideal of $A_K$ such that $\mathfrak{q} \cap A = \mathfrak{p}$. Then $\mathfrak{p}A_K \subseteq \mathfrak{q}A_K = \mathfrak{q}$. On the other hand, since $\alpha^q \in A \cap \mathfrak{q} = \mathfrak{p}$ for all $\alpha \in \mathfrak{q}$, we have $\mathfrak{q} \subseteq \sqrt{\mathfrak{p}A_K}$. Hence $\mathfrak{q} = \sqrt{\mathfrak{p}A_K}$ and $p$ is injective."

Page 95-96, Lemma 2.24 and Corollary 2.27: the proofs are changed. The first part of the original proof of 2.27 is incorrect. See the new text.

Page 99, line 4: add "such that $f^{(p)} \circ F_{X/S} = F_{Y/S} \circ f$" at the end of the sentence.

Page 99, line 7: replace $X^{(p)} \to Y^{(p)}$ by $f^{(p)}$.

Page 109, Remark 3.33, line 4: replace "(3) there exist projective varieties..." by "(3) there exist normal proper varieties...".

Page 113, line -4: "the radical of the set $\mathfrak{p}(i)$".

Page 122, line -11: in $B/fB \simeq \oplus_{1 \leq i \leq n} B_{\mathfrak{q}_i}/(f)$, replace $f$ by $b$.

Page 128, line -4: "let $(A, \mathfrak{m})$ be a Noetherian regular local ring...".

Page 129, last line of the proof of Proposition 2.11: delete "and".

Page 131, line 2: replace $(2t, -3s)$ by $(2t, -3s^2)$.

Page 139, Lemma 3.20: replace "$X_y$ is finite..." with "$X_y$ is finite, reduced, ...". In the third line of the proof, replace "$X_y$ is of dimension 0..." with "$X_y$ is of dimension 0 and reduced...".

Page 140-141, proof of Proposition 3.26: move the sentence "As $A \to B$ is a flat homomorphism... It follows..." right after "$f$ is étale at $x$" because we want to say that $A \to B$ is injective, which allows us to see $A$ as a subring of $B$.

Page 142, line -6: add "The set of points $x \in X$ such that $f$ is smooth at $x$ is called the *smooth locus* of $f$."

Page 143, line -6: replace $m_x/\mathfrak{m}_x^2$ by $\mathfrak{m}_x/\mathfrak{m}_x^2$.

Page 145, Exercise 4.3.8(a): weaken the hypothesis on $Z$ by assuming only $Z$ flat at one point. See the new text.

Page 150, line 20: Proposition 3.3.$\underline{16}$(e).

Page 151, line 5: replace $f^*$ by $f^\#$.

Page 152, line 14: replace $f_*\mathcal{O}_Y(W)$ by $f_*\mathcal{O}_X(W)$.

Page 153, Proposition 4.11: to clarify the statement, delete "(resp. étale)", and add "If $f$ is étale, then $g$ is an open immersion." at the end of the proposition.

Page 154, at the end of the proof of Lemma 4.13: "Exercise $\underline{3}$.2.16".

Page 155, line 7: replace $f_s$ by $f_s : X_s \to \mathbb{A}^d_{k(s)}$.

Page 155, line 10 (end of the proof): replace "Corollary 4.13" by "Lemma 4.13".

Page 155, Exercise 4.4.2(a): replace "principal closed subset" by "non-empty principal closed subset".

Page 155, Exercise 4.4.2(b): replace "$V_+(P) \cap \mathbb{P}^n_V$" by "$X \cap V_+(P) \cap \mathbb{P}^n_V$".

Page 162, line -6: the vertical arrows in the commutative diagram are in the opposite sense.

Page 168, lines 20, 22: exchange Lemma 1.25(a) and Lemma 1.25(b).

Page 169, begining of Remark 1.32: replace with "Let us fix a set of sections $s_0, ..., s_d$ of $\mathcal{L}(X)$ which generates $\mathcal{L}$. Then the morphism $f$ as in (b) is unique. Moreover, ..."

Page 170, line -3: replace $h_{ij} \in \mathcal{O}_X(X_j)$ by $h_{ij} \in \mathcal{O}_X(X_{s_j})$.

Page 171, line 2: replace $U_{t_{ij}}$ by $U_{s_{ij}}$.

Page 173, bottom line : add "(called the *Picard group of* $X$)" after Pic(X).

Page 181, line -11: replace $(f_i)_i \mapsto f_i|_{U_i \cap U_j}$, by $(f_i)_i \mapsto (f_i|_{U_i \cap U_j} - f_j|_{U_i \cap U_j})_{i,j}$.

Page 184, line -8: replace $C^1(\mathcal{U}, \mathcal{F}'')$ by $\mathrm{Ker}(\mathrm{C}^1(\mathcal{U}, \mathcal{F}'') \to \mathrm{C}^2(\mathcal{U}, \mathcal{F}''))$.

Page 185, line 18, Formula (2.5) : replace "ldots" by "...".

Page 186, at the end of line 16: $U_\alpha$ is an index of $\mathcal{F}|$.

Page 188, bottom line: replace "$(\mathrm{Ker}\beta/\mathrm{Im}\alpha) \otimes_{\mathrm{A}} \mathrm{Id}_{\mathrm{M}}$" by "$(\mathrm{Ker}\beta/\mathrm{Im}\alpha) \otimes_{\mathrm{A}} \mathrm{M}$.

Page 195, line -2: "Exercise $\underline{1}$.16(c)".

Page 196, line 18: add at the end "(or, as pointed out by C. Ivorra, of a flasque resolution of the sheaf)".

Page 199, line 14: $H^p(\underline{X}, \mathcal{F}/\alpha^m\mathcal{F})$.

Page 204, Proposition 3.21(c): replace $R^p f_*(\mathcal{F} \otimes_{\mathcal{O}_Y} \mathcal{G})$ by $R^p f_*(\mathcal{F} \otimes_{\mathcal{O}_X} f^*\mathcal{G})$.

Page 205, line 5: "Let $\mathcal{I}$ be a coherent sheaf of ideals".

Page 205, Example 3.27: replace Lemma 2.1 by Lemma 3.1.

Page 207, line -4 : étale instead of ètale.

Page 212, line 3: the tensor product in on $B$ and not on $A$.

Page 215, line 5: The first "dim" is $\dim_K$.

Page 215, end of Remark 1.16: "Proposition 3.2.15".

Page 219, Exercise 6.1.2: add "in general" after "show that".

Page 220, Prop. 6.2.2: add a third equivalent property "(iii) $X$ is smooth at $x$". Change the proof of (i) $\Longrightarrow$ (ii) to (iii) $\Longrightarrow$ (ii). See the new text.

Page 221, line 9: $\dim_{k(z')} \Omega^1_{\overline{U},z'} \otimes k(z')$.

Page 222, line 9: replace "$\mathcal{I}(Y)$" by "$\mathcal{O}_Y(Y)$".

Page 222, line 20 (end of the proof) : replace "$\dim_z Z_s$" by "$\dim_x Z_s$".

Page 222, Prop. 6.2.5: change the proof. See the new text.

Page 222, bottom line: move "where $s = f(x)$" to the end of Formula (2.5), and replace $\Omega^1_{X,x}$ by $\Omega^1_{X/S,x}$.

Page 229, Lemma 6.3.10: replace "homomorphism of flat rings" by "flat homomorphism of rings".

Page 230, lines 3-4: suppose that $X \cap Y'$ is non-empty. The statement on the dimension of $X$ is **false**. replace by : "$\dim \mathcal{O}_{X,x} = \dim \mathcal{O}_{Y,x} - n$ for all $x \in X$" (no finitenesse hypothesis on $\dim Y$).

Page 230, line 20: add "(Exercise 2.5.2)" after "property is local".

Page 230, line -15: suppress "when $\dim Y'$ is finite".

Page 231, line 19 (proof of Cor. 3.14): replace "Taking $X = ...$ in exact sequence (3.7)" with "Applying exact sequence (3.7) to the morphism of $Y$-schemes $\pi : Y \to X$".

Page 233, lines 19-20: "$f$ is a regular immersion".

Page 234, lines 4 and 5: replace $\mathcal{O}_{Z_y}$ by $\mathcal{O}_{Z_y,x}$.

Page 235, line 10: replace "$F_1, ..., F_n$" by "$F_1, ..., F_n \in \mathcal{O}_Y(V)[T_1, ..., T_n]$".

Page 235, Exercise 6.3.5(c): replace "$\mathcal{O}_X(U) \otimes k(y)$" with "$k(y)[T_1, ..., T_n]$".

Page 235, Exercise 6.3.7: Suppose that $k(x) = k(y)$ and delete the term

$\dim_{k(x)} \Omega^1_{k(x)/k(y)}$ in line -15.

Page 235, line -8: replace "be an l.c.i." by "be a dominant l.c.i."

Page 237, lines 11-12: "be respective bases of $\underline{L}$ and $N$ .... is a basis of $\underline{M}$".

Page 239, line 8: add the sentence "If $f : X \to Y$ is a regular immersion, then $\omega_{X/Y} = \det(\mathcal{C}_{X/Y})^\vee$." before "Let us".

Page 252, lines -17 and -16 : replace "equivalenct" by "equivalent" and "Remark 1.20" by "Proposition 1.32".

Page 253, end of Lemma 1.2(b): add "and $\mathfrak{p} \cap S = \emptyset$".

Page 254, lines 2, 11: replace Ann($x_1$A) by Ann($x_1$), Ann(xA) by Ann(x), and Ann($\bar{x}$A) by Ann($\bar{x}$).

Page 254, end of the proof of Corollary 1.5: replace Ass(yA) = $\mathfrak{p}$ by Ass(yA) = $\{\mathfrak{p}\}$.

Page 255, Lemma 1.12(a): the **statement is false**. Fortunately, this does not change the rest of the book. See the new text.

Page 256, Proposition 1.5: The proof is rewriting in great part. See the new text.

Page 258, Remark 1.20: replace by the new text.

Page 260, line -6: $E|_X \geq 0$ instead of $E|_X > 0$.

Page 261, Proposition 1.32: give and prove the statement for any quasi-projective scheme over a Noetherian affine scheme. See the new text.

Page 262, line 2: replace "$f_*\mathcal{K}_x$" by "$f_*\mathcal{K}_X$".

Page 262, at the end of Definition 1.34: add "By construction, $f^*D$ is principal if $D$ is principal. Hence $f^*$ induces a canonical homomorphism CaCl(Y) $\to$ CaCl(X)."

Page 262, at the end of Remark 1.35: replace "$\mathcal{O}_X(-f^*D)$" by "the sheaf of ideals $\mathcal{O}_X(-f^*D)$".

Page 262, Lemma 1.36(a): add "and $[B/\mathfrak{n} : A/\mathfrak{m}] < +\infty$."

Page 263, Proposition 1.38, line 12: replace $3x$ by $x$ in the displayed formula.

Page 263, line -16: replace "basis of $K(Y)$ over $K(X)$" by "basis of $K(X)$ over $K(Y)$".

Page 266, Exercise 1.10(b): the **statement is false in general**. See the new text.

Page 269, Proposition 2.11(b): replace $x \in U$ by $x \in X$.

Page 269, line -6 : replace $\mathcal{O}_{x,x}$ by $\mathcal{O}_{X,x}$.

Page 271, lines 1-2: "Let $X$ be a Noetherian regular integral (hence normal,...)

scheme".

Page 271, line 13: replace $(f_x, U_x)$ by $(U_x, f_x)$.

Page 273, line 10: replace $[\Delta_i] = \Gamma_i$ by $[\Delta_i] = f(\Gamma_i)$.

Page 275, line 18: replace $k(x_i)$ by $k(x)$.

Page 275, line -5: add "(note that $\mathrm{mult_x(D)} = 0$ if $x \notin D$)" before "we obtain the lemma".

Page 276, line 2: replace "finite set, hence closed..." by "finite set. As $b_i$ is a regular element, it does not contain generic points of $U_i$. Hence $V(b_i)$ is closed...".

Page 276, line 17: replace the proof of Prop.3.7(b) by "For all $x \in X$, $\mathrm{mult_x(D)}$ does not depend on the base field. So the equality comes from the fact that $[k(x) : k'] = [k : k'][k(x) : k]$. "

Page 276, end of Proposition 3.8: Definition 4.1.19.

Page 278, Remark 7.3.14: replace "equivalence of categories between normal projective curves over $k$ and function fields in one variable over $k$." by "equivalence between the category of normal projective curves over $k$ with finite morphisms and the category of function fields in one variable over $k$ with homomorphisms of $k$-algebras ."

Page 282, line -8: suppress "and Remark 1.20".

Page 284, line 7: replace "Remark 1.20" par "Proposition 1.32".

Page 286, lines 14-18 (end of the proof of Lemma 4.3): replace with the new text.

Page 290, line 9: "Then Lemma 1.36(c) can be...".

Page 290, line -16: "By Proposition 3.8 and Corollary 3.31(a)".

Page 290, line -14: "we have an injective canonical homomorphism".

Page 291, Proposition 7.4.21: replace "geometrically reduced" by "smooth over $k$".

Page 291, line -3: "by Exercise 4.3.13(a) and Proposition 3.13".

Page 301, Exercise 7.4.7(c) : replace by "By considering the degree of $h - \sigma(h)$, show that we have $g \leq 1$. Conclude."

Page 306, lines 1-4: replace "Using Lemma... (Exercise 1.9)." by "Using Proposition 1.32, we may suppose that $\mathcal{L} \simeq \mathcal{O}_X(D)$ for some Cartier divisor $D$ on $X$. By Lemma 3.6, we can even suppose $D$ effective."

Page 313, line 6: replace $p_a(Y) - p_a(X)$ by $p_a(X) - p_a(Y)$.

Page 313, line -7: replace $p_a(X)$ by $p_a(X_{red})$.

Page 318, line -15: add "or $(I)$" at the end of the line.

Page 319, line -6: replace "$u = t_2/t_1$" by "$u = y/x \in \mathrm{Frac(A)}$".

Page 319, line -5: replace "Speck[v] with $v = t_1/t_2$" by "$k[v, 1/v]$ with $v = x/y$".

Page 320, line 6: replace "Lemma 1.2(c)" by "Lemma 1.2(e)".

Page 321, line -6: replace "$V(\mathcal{I})$" by "$V(\mathcal{I})$ (or $\mathcal{I}$)".

Page 330, Remark 1.27: replace "integral scheme" by "integral schemes". And after "everywhere.", add "Let $X$ be an integral curve over a field $k$."

Page 333, bottom line: $\dim \mathcal{O}_{X,x} = \dim \mathcal{O}_{Y,y} \underline{+1}$.

Page 335, line 3: $y \in \underline{Y}$.

Page 336, line 5: replace SuppM by Ann(M).

Page 366, lines 1-2: replace "resolve ... (3.11)" with "resolve the possible singularities of $X$ using the sequence (3.11)".

Page 367, Example 8.3.54: replace "$X_2$" by "$X_1'$" (two occurrences) to be coherent with the notation of the sequence (3.11).

Page 367, Figure of Example 8.3.54: $\widetilde{X}_k$ meets the elliptic curve transversally.

Page 382, first line in Remark 1.13: $A = \mathcal{O}_{S,s}$.

Page 383, line 5-7: replace "denote the... on $S$ by $D \cdot E$," by "denote by $D \cdot E$... on $S$,"

Page 383, end of Remark 1.17: add "See also Remark 2.13".

Page 391, Exercise 1.2: replace $\mathrm{SuppD_i}$ by $\mathrm{SuppD_i'}$.

Page 395, line 7: "be a <u>birational</u> morphism of ...".

Page 395, lines 8-9: replace "$g : X \to \widetilde{Y}$ and $\pi : \widetilde{Y} \to Y$" by "$X \xrightarrow{g} \widetilde{Y} \xrightarrow{\pi} Y$".

Page 395, line -9: add "Then $\dim X_y \geq 1$ by Corollary 4.4.3(b)" after "$y \in f(\mathcal{E})$".

Page 397, line 9, Definition 2.8: suppress integrality hypothesis on $X, Y$.

Page 397, last line of Remark 2.9: replace "and is proven in the same maner" by ". See also Remark 2.13".

Page 398, Theorem 2.12(c): replace the letter "$C$" by "$F$" (because $C$ is already used for divisors on $X$).

Page 398-400, from the beginning of the proof of (b) to the end of page 400: there is a new version because of a gap in the proof of Prop. 2.15.

Page 416, line -4: "Theorem <u>4</u>.15".

Page 417, lines -6 : replace "process around " by "blowing-up process around"

Page 422, line -17: replace $K_{X/S}$ with $K_{Z/S}$ (three occurrences).

Page 427, line 4 and end of Remark in Exercise 3.2: replace "[89]" by "[90]".

Page 438, lines 2 and 4: switch $n$ and $n+1$:

$$0 \to \mathcal{J}^{n+1} \to \mathcal{J}^n \to ...$$

$$0 \to \mathfrak{m}_y^{n+1} \to \mathfrak{m}_y^n \to ...$$

Page 440, line 11: replace "$S \setminus U$" by "$S \setminus V$".

Page 457, line 12, Remark 1.11: replace "regular models regular models, with normal crossings" by "regular models, regular models with normal crossings".

Page 484, line 15: add "By Corollary 9.3.27, the canonical divisor $K_{\mathcal{E}/S}$ is trivial."

Page 489, at the end of Remark 10.2.3: replace the last sentence "$\mathcal{E}_s$... " by "a component of $\mathcal{E}_s$ can be of multiplicity 1 without being geometrically reduced."

Page 510, proof of Corollary 3.13: delete "$+2\mathrm{Card}\Gamma_{\mathrm{sing}}$" in the display formula.

Page 518, line -10: "a smooth projective curve...".

Page 521, second line in Lemma 3.40: "discrete valuation ring $\mathcal{O}_K$".

Page 521, line -4: "(Exercise 9.2.9(c))".

Page 534, line -18: "Let $L$ be the compositum".

Page 535, lines -7 to -2: replace "Let ... hence $\xi \in \widehat{B}$" by a new text.

Page 536, lines 2, 6: replace $\alpha$ by $\alpha_1$ and $\gamma$ by $\alpha_2$.

Page 536, line 5: add ", Frac(D) = Frac(A), " before "and that".

Page 536, Formulas (4.33), (4.34): remove "$\xi$" (it is equal to 1).

Page 540, line -3: "Betti number of the graph associated to $T$".

Page 540, line -2: replace "the text preceding Definition 4.1.54" by "Definition 1.46".

Page 543, Definition 4.27: replace ", and $\mathcal{C} \times_{\mathrm{Spec}\mathcal{O}_L} \mathrm{Spec}\overline{\mathrm{k(s')}}$ ... the *potential stable reduction* of $C$" by ". The curve $\mathcal{C} \times_{\mathrm{Spec}\mathcal{O}_L} \mathrm{Spec}\overline{\mathrm{k(s')}}$ is called the *potential stable reduction* of $C$".

Page 545, Remark 4.33, lines 21-22 : replace "Proposition 4.30. If the order of $G$ is ..." By "Proposition 4.30 but with group $G$ of order ... "

**New entries in Index**

Rad(A), radical of $A$, 9

$Z_0(X)$, group of 0-cycles on $X$, 399

$Z^1(X)$, group of cycles of codimension 1 on $X$, 267

image, scheme-theoretic, 58

isolated point, 56; point, isolated, 56
Picard group, 539
projection formula, 399
semi-stable curve, 506
smooth locus, 142